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THE EDINBURGH STEREOSCOPIC ATLAS OF ANATOMY

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SECTION III

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ABDOMEN.

ABDOMINAL CAVITY.—No. 8.

SUPERFICIAL VIEW OF THE ABDOMINAL AND THORACIC VISCERA IN SITU.

This view shows a condition of the hollow abdominal viscera which is found in a large number of cases.

The condition is as follows:—The stomach is well filled, but retains an almost horizontal direction, and it is bounded by the liver on the right side, the diaphragm above and the transverse colon below. The greater curvature is almost horizontal, and looks directly forwards.

The small intestine is moderately distended, and the large intestine very considerably dilated, but the collapse of the wall shows that this distension has been largely gaseous, and not due to solid contents.

This distension has pushed the liver well up into the right hypochondriac region, so that it does not extend far beyond the mesial plane.

The transverse colon is moulded upon the under surface of the stomach, and, passing beyond it, comes into contact with the projecting lower end of the spleen, which is here of a long and narrow shape, so that its lower end can be seen from the front.

The surface of the left lung is exposed, and its shape is very typical. The pleura was somewhat adherent to the right lung.

The thymus gland projects downwards in front of the pericardium, but it is larger in this subject—a young subject, æt. six—than is usually the case in an adult.

The figures indicate—

1. Greater curvature of the stomach.
2. Left lobe of liver.
3. Pericardium.
4. Transverse colon.
5. Lower end of spleen.
6. Thymus gland.

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ABDOMEN.

ABDOMINAL CAVITY.—No. 9.

THE SMALL INTESTINE HAS BEEN REMOVED BY DIVIDING THE MESENTERY NEAR ITS ROOT, AND THE GREAT OMENTUM AND TRANSVERSE COLON HAVE ALSO BEEN REMOVED.

This view, from the same subject as No. 8, shows how the stomach is supported below to a great extent by the intestine.

The form and position of the stomach are highly characteristic, and it will be noticed that the pylorus has moved somewhat to the right of the mesial plane of the body.

The condition of the large intestine is of great interest. Following upon distension of the proximal part of the colon, the cæcum has become dilated, and so altered in its shape and position as to resemble a second stomach situated in the hypogastric region.

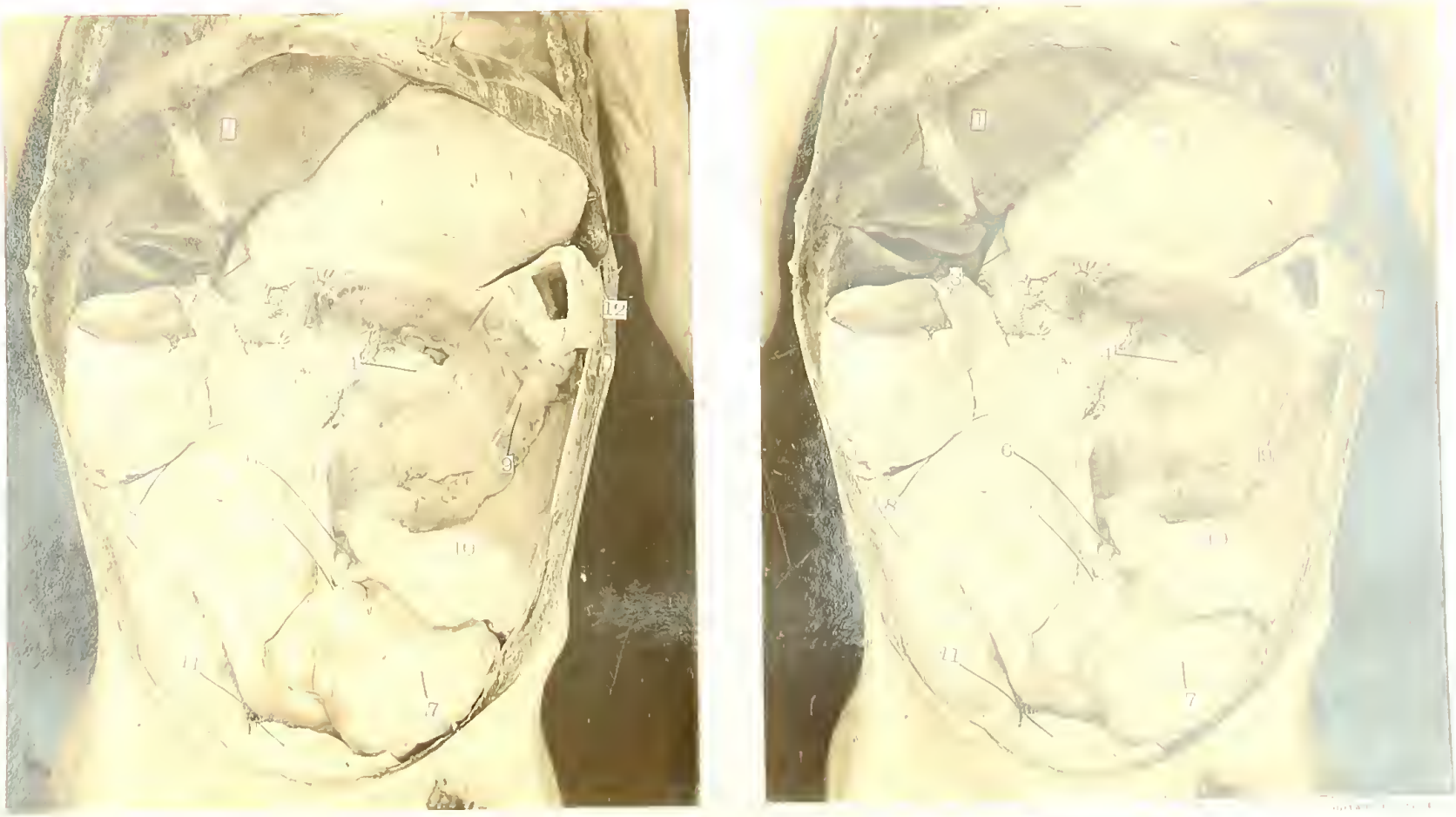
The termination of the ileum enters this dilated chamber almost vertically, and the appendix vermiformis is seen lying behind and above the cæcum. This is another of the numerous positions which it may assume, and it may be said in this case to lie more in the left than in the right side of the body.

The descending colon, as is almost invariably the case in subjects prepared with formalin, is firmly contracted, but the large loop of the pelvic colon shows a moderate degree of distension.

The figures indicate:—

1. Left lobe of the liver.
2. Antero-superior surface of stomach.
3. Pylorus.
4. Duodeno-jejunal flexure.
5. Termination of ileum.
6. Appendix vermiformis.
7. Cæcum.
8. Hepatic flexure of colon.
9. Descending colon.
10. Pelvic colon.
11. Urinary bladder.
12. Splenic flexure of colon.

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ABDOMEN. ABDOMINAL CAVITY. No. 9.
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ABDOMEN.

ABDOMINAL CAVITY—No. 10.

IN ADDITION TO THE PREVIOUS DISSECTION, THE CÆCUM AND ASCENDING COLON HAVE BEEN REMOVED, AND THE PERITONEUM STRIPPED OFF THE POSTERIOR ABDOMINAL WALL.

This view shows in a very typical manner the anterior relations of the kidneys.

The anterior surface of the right kidney is very largely in contact with viscera—namely, the liver above, the hepatic flexure in the outer part, and the duodenum on the inner side, so that only the lower end is visible, while the left kidney is seen to have the pancreas and suprarenal capsule in contact with its upper part, and the colon along its outer margin, while the termination of the duodenum reaches the hilum. Branches of the inferior mesenteric artery crossing its surface constitute an important relation from a surgical standpoint.

The arrangement of the pelvic colon is noticeable. In a young subject, such as this, it frequently does not descend into the pelvis, which is relatively small, but is entirely intra-abdominal in position.

The dilated cæcum occupied nearly the whole of the anterior part of the pelvic cavity.

The figures indicate—

1. Stomach.
2. Liver, and ligamentum teres.
3. Pylorus.
4. Second part of duodenum.
5. Superior mesenteric vessels.
6. Hepatic flexure of colon.
7. Splenic flexure of colon.
8. Pelvic colon.
9. Left kidney.
10. Abdominal aorta.
11. Body of pancreas.
12. Urinary bladder.

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ABDOMEN. ABDOMINAL CAVITY. No. 10.
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ABDOMEN.

PELVIS—No. 9.

RECTUM VIEWED FROM BEHIND.

The sacrum has been sawn across through the middle of its third piece, and the lower part removed, with the coccyx, after dividing the sacro-sciatic ligaments.

A portion of the levator ani muscle has been removed, and the fat and lymphatic glands, etc., behind the rectum taken away. The sheath of the left seminal vesicle has been opened.

The **rectum** begins where the mesentery of the pelvic colon ends, usually at the third piece of the sacrum. It passes along the hollow of the sacrum and coccyx forwards as far as to the back of the prostate, and then alters its direction and passes backwards as the anal canal.

In its course it presents some distinct flexures, of which two are seen in this view.

The pelvic peritoneum invests it for some distance on either side and in front, and the two fossæ or pockets on either side, the para-rectal fossæ, are well seen.

Immediately below the level of the peritoneum the bases of the seminal vesicles project backwards, and are in close contact with the sides of the rectum. Their relationship to the apex of the ischio-rectal fossa should be noticed.

The dilated terminal portion of the rectum is known as the rectal ampulla.

The longitudinal muscular fibres form a strong band on this aspect and on the front of the rectum. Each band is made up of separate fasciculi between which the blood vessels, which are very numerous, enter and leave the wall.

Pelvic fascia.—The fascia upon the pelvic aspect of the levator ani and coccygeus muscles is very strong in this region, and helps to support the rectum, forming a tubular sheath for the intestine where it passes through the pelvic diaphragm. This is termed the rectal fascia.

The fascia further forward encloses the seminal vesicles, forming a sheath for them, and in this part is called the recto-vesical fascia.

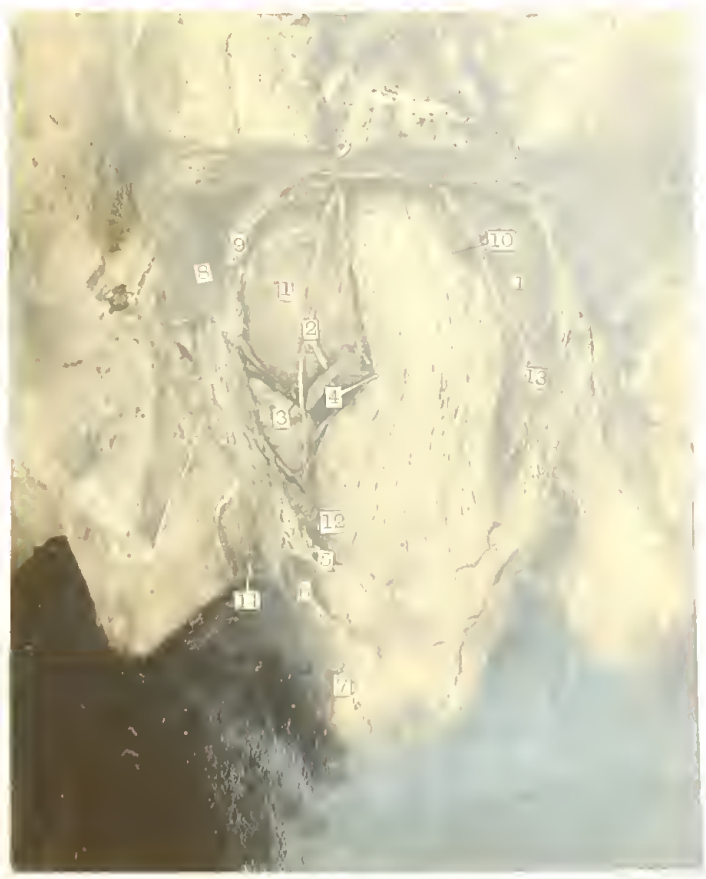
The figures indicate—

1. Peritoneum.
2. Superior hæmorrhoidal vessels.
3. Seminal vesicle.
4. Lower flexure of rectum.
5. Rectal fascia.
6. Levator ani muscle.
7. Sphincter ani externus.
8. Pyriformis muscle.
9. Second sacral nerve.
10. Upper flexure of rectum.
11. Ischio-rectal fossa.

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MALE PELVIS. No. 9.
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ABDOMEN.

PELVIS—No. 10.

THE SAME DISSECTION HAS BEEN CARRIED OUT AS IN NO. 9, AND A VIEW HAS BEEN TAKEN TO SHOW THE RECTUM AND PERITONEUM IN RELATION TO THE SACRUM AND COCCYX.

The reflection of peritoneum from the front of the rectum is seen to take place at the level of the lower end of the sacrum, and this is also the lowest limit of the pararectal fossæ.

The left fossa passes somewhat lower down than does the right, but this condition appears to be variable.

This view is intended to show the area which is available for surgical operations for the removal of the rectum by the sacral route, but the amount of the sacrum which can be taken away is strictly limited by the presence of the important sacral nerves.

The letter C indicates the first piece of the coccyx, the large 2 the posterior inferior spine of the ilium, the large 3, 4, and 5 indicate corresponding pieces of the sacrum.

The other small figures indicate:—

1. Reflection of peritoneum.
2. Superior hæmorrhoidal artery.
3. Seminal vesicle, left side.
4. Lower flexure of the rectum.
5. Rectal fascia.
6. Levator ani.
7. Sphincter ani externus.
8. Pyriformis.
9. Second sacral nerve.
10. Upper lateral flexure of rectum.
11. Ischio-rectal fossa.
12. Fascia investing seminal vesicle.
13. Right seminal vesicle.

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LOWER LIMB.

SCARPA'S TRIANGLE—No. 1.

THE SKIN, LAYERS OF FASCIA, CUTANEOUS NERVES AND VESSELS, ETC., WHICH FORM THE ROOF OF THE SPACE, HAVE BEEN REMOVED, TO SHOW THE BOUNDARIES AND CONTENTS OF THE TRIANGLE.

SCARPA'S TRIANGLE is a triangular space situated in the upper part of the front of the thigh.

It is bounded above by Poupart's ligament, externally by the sartorius, and internally by the inner margin of the adductor longus muscles.

POUPART'S LIGAMENT is a strong fibrous band extending from the anterior superior spine of the ilium to the spine of the pubis. At the inner end some fibres pass backwards and outwards and gain an attachment to the ilio-pectineal line. This portion is known as Gimbernat's ligament.

The SARTORIUS arises from the anterior superior spine of the ilium, and from the notch below it, and consists of parallel fleshy fibres which form a long, strap-like muscle, which passes obliquely across the front of the thigh, and the ADDUCTOR LONGUS takes origin by a rounded tendon from the front of the pubis, in the angle between the crest and symphisis, from which the fleshy fibres diverge in a fan-shaped manner, to an insertion into the inner lip of the linea aspera.

Within the space are found the femoral artery and vein and the anterior crural nerve, with branches derived from them, the termination of the long saphenous vein, the crural branch of the genito-crural nerve, and some deep femoral lymphatic glands, together with areolar and fatty tissue.

On the inner side of the femoral vein is the femoral or crural ring, through which a femoral hernia may occur. It is a narrow space bounded by Poupart's ligament in front, by the fascia of the pectineus muscle and the pubic bone behind, by Gimbernat's ligament internally, and by the femoral vein externally, from which it is separated by a thin septum. It is filled by some fatty tissue and a lymphatic gland.

The roof of Scarpa's triangle is seen in the views of the Inguinal Region (Section 2).

The figures indicate—

1. Femoral artery.
2. Femoral vein.
3. Bifurcation of the femoral artery, and branches of anterior crural nerve.
4. Deep external pudic vessels.
5. Cutaneous branches from anterior crural nerve.
6. Poupart's ligament.
7. Iliacus muscle.
8. Pectineus muscle.
9. Sartorius muscle.
10. Adductor longus muscle.
11. Rectus femoris muscle.
12. Ilio-tibial band.

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LOWER LIMB.

SCARPA'S TRIANGLE.—No. 2.

THE FEMORAL VESSELS AND THEIR BRANCHES HAVE BEEN DIVIDED, AND POUPART'S LIGAMENT HAS BEEN REMOVED.

The floor of Scarpa's triangle is formed of two planes inclined to one another, with a deep groove at their junction. The outer plane is formed by the iliacus and psoas muscles covered by the iliac fascia, and the inner by the pectineus and adductor longus muscles covered by the pubic fascia.

The space is therefore prismatic in form, the apex of the prism being formed by the junction of these two planes.

The **anterior crural nerve** lies in the interval between the psoas and iliacus muscles, while the femoral vessels lie on the psoas and pectineus.

The **internal circumflex vessels** escape from the triangle by passing between the psoas and pectineus muscles.

The **pectineus** is a quadrilateral sheet of muscle which arises from the ilio-pectineal line between the spine of the pubis and the ilio-pectineal eminence, from the bone in front of this line, and from the deep surface of the pubic fascia, close to its attachment to the ilio-pectineal line. When the muscles are small it does not come into contact with the adductor longus, and a small portion of the adductor brevis can then be seen from the front.

The nerve supply to the pectineus is seen to be a small branch from the anterior crural nerve which passes inwards behind the femoral vessels.

The root of the penis divided is seen to the right.

The figures indicate—

1. Sartorius muscle.
2. Adductor longus muscle.
3. Adductor gracilis muscle.
4. Pectineus muscle.
5. Rectus femoris muscle.
6. Iliacus muscle.
7. Psoas muscle.
8. Tensor fasciæ femoris muscle.
9. Attachments of Poupart's ligament.
10. Genito-crural nerve lying on psoas muscle.
11. Anterior crural nerve.
12. Internal circumflex artery.
13. Femoral vessels.
14. Profunda femoris artery.

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LOWER LIMB.

SCARPA'S TRIANGLE.—No. 3.

THE SARTORIUS MUSCLE HAS BEEN DIVIDED NEAR ITS ORIGIN AND REMOVED TO SHOW THE ARRANGEMENT OF THE STRUCTURES WITHIN THE SPACE.

The FEMORAL ARTERY begins at Poupart's ligament as the direct continuation of the external iliac artery. For a distance of about two inches it is known as the common femoral, but it then divides into two branches, one, the direct continuation, is known as the superficial femoral, while the other branch, passing deeply, is called the profunda femoris.

The common femoral is superficially placed, being covered only by the roof of the triangle, and by some of the contents, and it rests upon the muscles forming the floor, *i.e.* upon the psoas and pectineus, while lower down, the superficial femoral lies upon the adductor longus.

The femoral vein lies at first along the inner side, but comes to lie behind the superficial femoral artery, and the anterior crural nerve lies to the outer side. The branches of this nerve pass in different relations to the artery, the nerve to the pectineus passes behind it, the internal cutaneous nerve crosses in front of it, and the long saphenous nerve and the nerve to the vastus internus lie along its outer side.

Branches.—The superficial inguinal branches have been previously seen, and the deep external pudic runs across the pectineus and adductor longus muscles to the external genitals.

The course of the profunda femoris and its branches is seen in another view, and also the branches given off by the superficial femoral in Hunter's canal.

The figures indicate—

1. Sartorius muscle, divided.
2. Iliacus muscle.
3. Pectineus muscle.
4. Adductor longus muscle.
5. Rectus femoris muscle.
6. Tensor fasciæ femoris muscle.
7. Anterior crural nerve.
8. Middle cutaneous nerve, turned aside.
9. Muscular branches to vastus externus and crureus from anterior crural.
10. Long saphenous nerve.
11. Nerve to vastus internus.
12. Internal cutaneous nerve.
13. Femoral vein.
14. Femoral artery.
15. Poupart's ligament.

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LOWER LIMB.

HUNTER'S CANAL.—No. 1.

SKIN AND FASCIÆ HAVE BEEN REMOVED FROM THE FRONT AND INNER PART OF THE THIGH, TO SHOW THE MUSCLES AND NERVES.

The **sartorius** muscle passes obliquely downwards and inwards across the lower part of the thigh to its insertion into the upper part of the inner surface of the shaft of the tibia. It crosses the rectus femoris, vastus internus, adductor longus and magnus, and comes to lie in contact with the adductor gracilis, and conceals from view the femoral vessels lying in Hunter's canal.

This muscle is the most important and useful landmark of the front of the thigh, especially with reference to the femoral vessels.

Cutaneous nerves are seen in relation to its surface, the patellar branch of the long saphenous piercing it, and a branch from the internal cutaneous nerve joined by a branch from the anterior division of the obturator nerve running down on its surface.

In the interval between the vastus internus and sartorius is found the rounded tendon of the adductor magnus, and, in front of it, the long saphenous nerve and a branch of the anastomotica magna artery. This region is of importance surgically as being the place usually selected for osteotomy of the femur.

The figures indicate—

1. Rectus femoris muscle.
2. Vastus internus muscle.
3. Sartorius muscle.
4. Adductor longus muscle.
5. Adductor gracilis muscle.
6. Adductor magnus muscle and tendon.
7. Cutaneous branch of obturator nerve.
8. Patellar branch of long saphenous.
9. Long saphenous nerve, and branch of anastomotica magna artery.
10. Internal cutaneous nerve.

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LOWER LIMB.

HUNTER'S CANAL—No. 2.

In addition to the previous dissection, the sartorius has been divided, and its lower part removed, and the fascia which covers the femoral vessels has been removed also.

Hunter's canal is the name given to the tubular passage in which the femoral vessels pass in their course from the apex of Scarpa's triangle to the opening in the adductor magnus. It lies nearly in the middle third of the thigh, and it is bounded externally by the vastus internus muscle, behind by the adductor longus and magnus, and it is covered by the sartorius. A strong band of fibrous tissue stretches across the canal under the sartorius. Within the canal are found the femoral vessels, in relation to one another as seen, the artery lying in front of the vein, and at the lower part rather to its inner side, and with them is the long saphenous nerve and the origin of the anastomotica magna artery.

The **long saphenous nerve** lies on the outer side of the artery, but at the lower part it passes in front of the tendon of the adductor magnus, accompanied by a branch of the anastomotica magna branch of the femoral artery, and escapes from the canal in this way.

The **internal cutaneous nerve** is seen crossing the artery in several branches. It is joined by a branch of the obturator nerve, which then runs on and is distributed to the wall of the femoral artery.

When ligaturing the femoral artery here, the superficial structures are divided, the sartorius muscle pulled outwards, and the fascia under it divided.

The figures indicate—

1. Sartorius muscle divided.
2. Adductor longus muscle.
3. Vastus internus muscle.
4. Adductor magnus muscle.
5. Adductor gracilis muscle.
6. Semimembranosus muscle.
7. Aponeurotic roof, divided.
8. Nerve to vastus internus.
9. Long saphenous nerve on femoral artery.
10. Internal cutaneous nerve.
11. Branch from obturator nerve.
12. Femoral vein.
13. Long saphenous nerve and branch of anastomotica magna artery.

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LOWER LIMB.

DEEP DISSECTION OF THIGH—No. 1.

THE SUPERFICIAL STRUCTURES HAVE BEEN REMOVED, AND THE ADDUCTOR LONGUS, SARTORIUS AND RECTUS FEMORIS MUSCLES HAVE BEEN DIVIDED NEAR THEIR ORIGIN AND REMOVED.

The **anterior crural nerve** arises within the abdomen from the posterior branches of the anterior primary divisions of the 2nd, 3rd and 4th lumbar nerves. It enters the thigh by passing behind Poupart's ligament in the interval between the iliacus and psoas muscles, and rapidly breaks up into branches. These are divided into a superficial and a deep set, and the external circumflex artery passes out between them.

The **superficial set** consists of (1) muscular branches to the sartorius and pectineus muscles, the former passing directly to the muscle, and the latter passing inwards behind the femoral vessels, and (2) of the middle and internal cutaneous nerves. The latter nerve is seen passing inwards in front of the femoral artery in two branches. From the **deep division**, muscular branches are given to all the parts of the quadriceps extensor muscle, and a cutaneous branch, the long saphenous nerve, is seen passing downwards in company with the femoral artery, and entering Hunter's canal.

An articular branch is usually given to the hip joint, and some of the muscular branches pass to the knee.

The **external circumflex artery** is seen passing outwards from the profunda femoris artery under the sartorius and rectus femoris muscles.

On the inner side of the thigh, behind the adductor longus, muscular branches from the profunda femoris artery are found, with muscular branches from the anterior division of the obturator nerve, supplying the adductors longus, brevis and gracilis.

The figures indicate—

1. Sartorius muscle, divided.
2. Iliacus muscle.
3. Pectineus muscle.
4. Adductor longus muscle.
5. Rectus femoris muscle
6. Tensor fasciæ femoris muscle.
7. Adductor brevis muscle.
8. Adductor gracilis muscle.
9. Adductor magnus muscle.
10. Trunk of anterior crural nerve.
11. Branches of anterior crural nerve, and level of bifurcation of common femoral artery.
12. Long saphenous nerve and nerve to vastus internus muscle.
13. Nerve to vastus externus.
14. External circumflex artery.
15. Muscular branch of profunda femoris to adductor magnus muscle.
16. Branches of anterior division of obturator nerve.
17. Internal cutaneous nerve.
18. Femoral vein.
19. Poupart's ligament.

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LOWER LIMB.

DEEP DISSECTION OF THIGH.—No. 2.

In addition to the former dissection, the pectineus muscle has been divided and removed, and the superficial femoral vessels divided close to their upper end and removed, to show the profunda femoris vessels. The vein has been divided about 1½ inches lower than the artery.

The **profunda femoris** arises from the outer back part of the femoral artery, and after a short course outwards, passes inwards behind the femoral vessels, resting successively upon the iliacus, pectineus, adductor brevis, and adductor magnus muscles.

In this view, muscular branches are seen going to the adductor muscles, and it also gives off circumflex and perforating branches.

Behind the pectineus, the anterior division of the obturator nerve is seen emerging from the thyroid foramen over the obturator externus muscle.

On the outer side of the thigh is seen the fascial investment which clothes the tensor fasciæ femoris muscle. The layer upon the deep surface of that muscle passes deeply inwards to join the capsule of the hip-joint.

The figures indicate—

1. Sartorius muscle divided.
2. Iliacus muscle.
3. Pectineus muscle divided.
4. Adductor longus muscle.
5. Adductor brevis muscle.
6. Adductor gracilis muscle.
7. Adductor magnus muscle.
8. Obturator externus muscle.
9. Rectus femoris muscle.
10. Tensor fasciæ femoris.
11. Fascia on deep aspect of tensor fasciæ femoris.
12. Points to crural canal.
13. Poupart's ligament.
14. Femoral artery divided.
15. Profunda femoris vessels.
16. Muscular branches of anterior crural nerve.

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LOWER LIMB.

DEEP DISSECTION OF THIGH.—No. 3.

In addition to the dissection described in Scarpa's triangle, No. 2, the iliacus and sartorius muscles have been divided, and portions removed.

The **tensor fasciæ femoris** muscle arises from the outer lip of the crest of the ilium, the notch below the anterior superior spine, and from the fascia covering the muscle, and is inserted into the fascia lata.

The **rectus femoris** arises by two heads, a straight head, attached to the anterior inferior spine of the ilium, and a reflected head, not seen, attached to the dorsum of the ilium above the acetabulum.

These muscles constitute important guides in cutting down upon the hip joint from the front.

Behind the iliacus is seen the front of the capsule of the hip-joint, and upon it is a smooth surface forming the back wall of a bursa, which occasionally communicates with the joint cavity.

The fibrous tissue forms a prominent vertical band between the iliacus and psoas.

The relations of the superficial femoral vessels and the profunda femoris should be noticed—the profunda artery lies on the outer side of the femoral vein in this part of its course, while the profunda vein joins the femoral vein lower down, where that vein is lying behind its corresponding artery.

The nerve to the pectineus muscle is seen in close relation to the internal circumflex artery.

The figures indicate—

1. Sartorius muscle.
2. Iliacus muscle.
3. Psoas muscle.
4. Rectus femoris musele, straight head.
5. Tensor fasciæ femoris musele.
6. Pectineus muscle.
7. Adductor longus muscle.
8. Bursa in front of capsule of hip-joint.
9. External iliac artery and genito-crural nerve.
10. Femoral vein, lying behind femoral artery.
11. Profunda femoris artery and branches of anterior crural nerve to vastus internus.

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LOWER LIMB.

DEEP DISSECTION OF THIGH.—No. 4.

The pectineus and psoas muscles have been reflected, in addition to the dissection in No. 3, and an additional inch of the femoral vessels has been removed.

The **capsule of the hip-joint** is closely invested by numerous powerful muscles.

On the **outer side** are the gluteus minimus and gluteus medius, **in front** the rectus femoris, iliacus, and psoas, in that order from without inwards. Further to the inner side is the pectineus, and behind it the adductor magnus, with the obturator externus winding round below the capsule.

These relations are of great importance in connection with the spread of abscesses from the hip-joint.

The **internal circumflex artery,** having passed between the psoas and pectineus, continues its course backwards between the adductor magnus and obturator externus, giving branches to these muscles.

The **obturator nerve** is seen running on the surface of the adductor magnus, but only a small portion of the adductor brevis is seen, at the upper border of the adductor longus.

A further relationship of the superficial femoral and profunda femoris vessels should be noticed.

The nerve to the tensor fasciæ femoris is seen just above and outside 2.

The figures indicate—

1. Gluteus medius muscle.
2. Gluteus minimus.
3. Tensor fasciæ femoris muscle.
4. Rectus femoris muscle.
5. Ilio-psoas muscle.
6. Vastus externus muscle.
7. Peetineus muscle.
8. Adductor longus muscle.
9. Adductor gracilis muscle.
10. Adductor magnus muscle.
11. Obturator externus musele.
12. Obturator nerve.
13. Bursa in front of capsule of hip joint.
14. Femoral vessels.
15. Profunda femoris vessels.

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LOWER LIMB DEEP DISSECTION OF THIGH.
No. 4.
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LOWER LIMB.

GLUTEAL REGION—No. 1a.

THE SUPERFICIAL STRUCTURES HAVE BEEN REMOVED TO SHOW THE GLUTEUS MAXIMUS AND THE CUTANEOUS NERVES.

The gluteal region extends from the crest of the ilium above to the gluteal fold below, and from the middle line outwards as far as to the great trochanter of the femur.

The cutaneous nerves in this region are as follows:—

(1) Crossing the crest of the ilium near the outer margin of the erector spinæ muscle are three branches from the posterior primary divisions of three lumbar nerves.

The iliac branches of the ilio-hypogastric and last dorsal nerves cross the iliac crest further forwards and are not shown.

(2) Piercing the gluteus maximus are some small branches from the posterior primary divisions of the upper sacral nerves, usually three in number.

(3) Winding round the lower margin of the gluteus maximus are a perforating cutaneous nerve from the anterior primary divisions from the second and third sacral nerves, and some branches from the small sciatic nerve. The latter are external to the ischial tuberosity, the former internal.

(4) On the outer side, some terminal twigs from the external cutaneous nerve of the thigh may be found near the great trochanter.

The **gluteus maximus** is a large muscle with a wide origin (see No. 1). It is quadrilateral in outline. Above and to its outer side lie the gluteal fascia covering the gluteus medius muscle. This fascia encloses the gluteus maximus. Below the lower margin lie the fat, etc. of the ischio-rectal fossa, and, further out, the small sciatic nerve and the upper part of the hamstring muscles.

It will be noticed that the lower border of the muscle is oblique in direction, and therefore does not correspond to the gluteal fold, which is transversely directed, and crosses the lower border of the muscle.

The figures indicate—

Bony points.
1. Posterior superior iliac spine.
2. Sacral cornua.
3. Great trochanter.

Muscles, etc.
4. Semitendinosus and biceps.
5. Semimembranosus.
6. Adductor magnus.
7. Ischio-rectal fossa.

Nerves.
8. Lumbar branches.
9. Sacral branches.
10. Perforating cutaneous.
11. Branches of small sciatic.
12. Long pudendal.
13. Small sciatic.

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LOWER LIMB.

GLUTEAL REGION—No. 1.

THE SUPERFICIAL STRUCTURES HAVE BEEN REMOVED, AND THE GLUTEUS MAXIMUS TAKEN AWAY IN NEARLY ITS WHOLE EXTENT. THE GLUTEUS MEDIUS HAS ALSO BEEN REMOVED, AND THE ISCHIO-RECTAL FOSSA HAS BEEN OPENED UP FROM BEHIND.

The **gluteus maximus** has an extensive origin from the rough surface on the ilium between the superior curved line and the crest, and from the sides and back of the lower two pieces of the sacrum and upper three pieces of the coccyx, as well as from the great sacro-sciatic ligament and the lumbar aponeurosis. It is inserted partly into the gluteal ridge of the femur, but chiefly into the fascia lata.

The **gluteus medius**, arising from the dorsum of the ilium, is inserted into the outer aspect of the great trochanter.

Under cover of these two muscles are the greater and lesser sciatic foramina, with the structures transmitted by them.

Through the greater notch emerges the pyriformis muscle, which is a useful landmark, since the gluteal vessels and superior glutcal nerve lie above it, and several other structures below it. The great sciatic nerve, however, not infrequently (as here) emerges in two divisions, of which the upper, representing the peroneal or external popliteal nerve, comes through the pyriformis muscle, splitting it into two parts, while the lower, representing the tibial or internal popliteal nerve, emerges below it. The trunk of the nerve lies almost midway between the ischial tuberosity and the great trochanter, rather to the inner side.

The great sciatic nerve rests upon the innominate bone, with the nerve to the quadratus femoris intervening, on the pyriformis and gemelli, the quadratus femoris and adductor magnus muscles.

The gluteal artery divides almost at once into a superficial division, which supplies the gluteus maximus, and a deep division, which ramifies in two branches upon the ilium. The superior glutcal nerve accompanies the deep division of the artery, and supplies the gluteus medius and minimus and the tensor fasciæ femoris muscles.

The other deeply-seated structures are shown in another view.

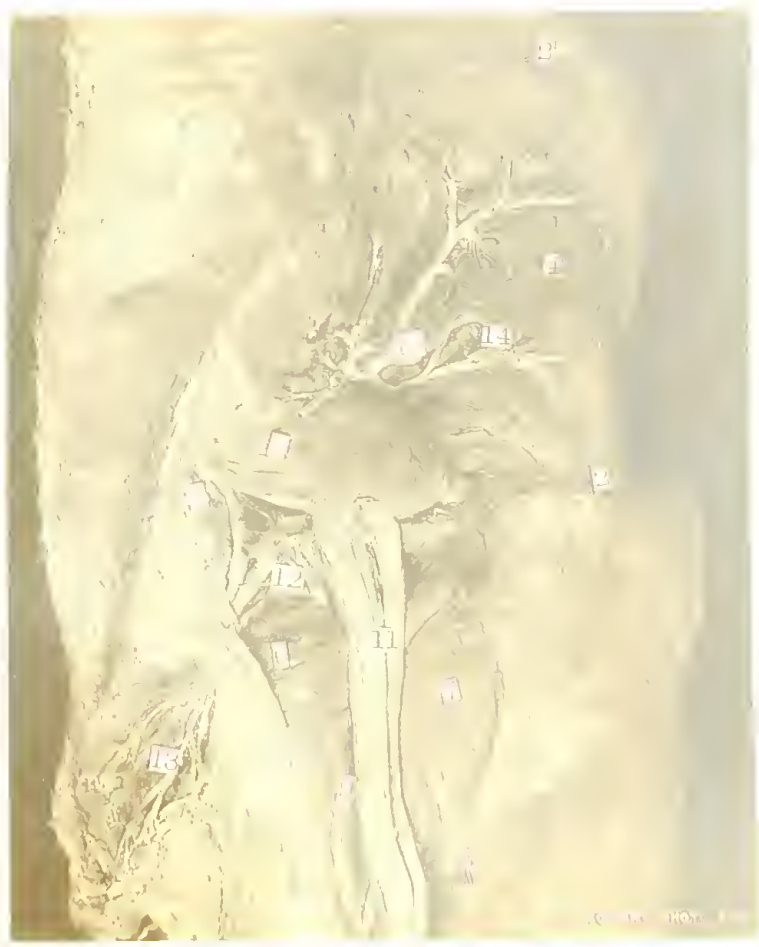
The figures indicate—

1. Ischial tuberosity.
2. Gluteus medius (divided).
3. Gluteus maximus (divided).
4. Gluteus minimus.
5. Pyriformis.
6. Obturator internus and gemelli.
7. Quadratus femoris.
8. Tendon of biceps and semitendinosus.
9. Tendon of semimembranosus.
10. Gluteal vessels.
11. Great sciatic nerve.
12. Internal pudic vessels and nerve, and nerve to obturator internus.
13. Inferior hæmorrhoidal vessels and nerve.
14. Superior gluteal nerve.

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LOWER LIMB—GLUTEAL REGION. No. 1.
EDINBURGH STEREOSCOPIC ANATOMY





LOWER LIMB.

GLUTEAL REGION.—No 2.

PORTIONS OF THE PYRIFORMIS, OBTURATOR INTERNUS AND GEMELLI, AND QUADRATUS FEMORIS MUSCLES, HAVE BEEN REMOVED, AND THE TENDON OF THE BICEPS AND SEMITENDINOSUS DIVIDED AND TURNED ASIDE.

Below the level of the pyriformis muscle, the sciatic and internal pudic arteries emerge close to one another through the great sacro-sciatic foramen.

The internal pudic artery, with two venæ comites, passes almost at once into the lesser sacro-sciatic foramen, lying above the obturator internus muscle, and it is accompanied by the internal pudic nerve and the nerve to the obturator internus. The latter nerve lies close to the muscle to which it is distributed, *i.e.* on the outer side of the artery, and it gives a branch to the superior gemellus muscle. The internal pudic vessels and nerve then pass into the lateral wall of the ischio-rectal fossa, and there give off their inferior hæmorrhoidal branches.

The nerve to the quadratus femoris is a small muscular branch from the sacral plexus which passes down, covered by the great sciatic nerve and by the obturator internus and gemelli muscles. It supplies also the inferior gemellus muscle and the hip-joint.

With these dissections, the view of the Hip-joint should be referred to. (Hip-joint, No. 1.)

The figures indicate—

1. Ischial tuberosity.
2. Great trochanter of femur.
3. Gluteus minimus.
4. Pyriformis (divided).
5. Obturatur internus and gemelli (divided).
6. Quadratus femoris (divided).
7. Gluteus medius (insertion).
8. Internal pudic vessels and nerve, and nerve to obturator internus.
9. Great sciatic nerve.
10. Nerve to quadratus femoris.

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LOWER LIMB GLUTEAL REGION. No. 2.
EDINBURGH STEREOSCOPIC ANATOMY

LOWER LIMB.

BACK OF THIGH.—No. 1.

THE SKIN, LAYERS OF FASCIA, AND SUPERFICIAL STRUCTURES HAVE BEEN REMOVED TO SHOW THE MUSCLES.

The hamstring group of muscles forms a large muscular mass on the back of the thigh.

The biceps and semitendinosus, arising by a common tendon from the posterior, inferior, and internal facet on the back part of the ischial tuberosity, lie at first side by side.

The semimembranosus arising from the anterior, superior, and external portion of this area of the ischial tuberosity is concealed in the upper part, but, lower down, appears between the other muscles, and lies more in the centre of the limb.

The biceps covers the great sciatic nerve, crossing it very obliquely from above downwards and outwards, and under cover of that muscle the nerve usually divides into the two terminal branches which, in this specimen, lie very superficially in the popliteal space.

A septum of connective tissue separates the biceps from the adjacent vastus externus muscle, but there is only a very thin septum between the semimembranosus and the adductor muscles on the inner side of the thigh.

The hamstrings are all supplied by the great sciatic nerve.

The figures indicate :—

1. Biceps muscle.
2. Semitendinosus muscle.
3. Semimembranosus muscle.
4. Gluteus maximus insertion.
5. Vastus externus muscle.
6. Adductor magnus muscle.
7. Adductor gracilis and sartorius muscles.
8. Quadratus femoris muscle.
9. Great sciatic nerve in two bands.
10. External and internal popliteal nerves.

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LOWER LIMB.

BACK OF THIGH—No. 2.

THE BICEPS, SEMIMEMBRANOSUS AND SEMITENDINOSUS HAVE BEEN REMOVED, TO EXPOSE THE ADDUCTOR MAGNUS AND THE GREAT SCIATIC NERVE LYING ON IT.

The great sciatic nerve, arising from L 4, 5, S 1, 2, 3, runs downwards in the thigh on the posterior surface of the adductor magnus, under cover of the long head of the biceps muscle, as far as to the upper angle of the popliteal space, where it divides into the internal and external popliteal nerves. This division often occurs higher up, and in all cases the two parts, tibial and peroneal, of which the nerve consists, can be made out, and the branches which are given off by the single trunk can be referred to one or other of the two divisions.

Thus, from the tibial division arise branches to the semimembranosus, semitendinosus, long head of biceps and to the dorsal, or hamstring portion, of the adductor magnus muscles, while the outer, or peroneal division gives a branch to the short head of the biceps, and often an articular branch to the knee-joint.

The **adductor magnus** muscle consists of two portions. The one, truly adductor in character, arises from the anterior surface of the arch of the pubis. Its fibres are horizontal in direction above, and oblique lower down, and are inserted into the back of the femur internal to the gluteal ridge, into the linea aspera, and into a small portion of the internal supracondylar ridge.

The other portion, hamstring in character, arises from the lower part of the ischial tuberosity, and passes in a vertical direction, forming the inner thick part of the muscle, to be inserted into the adductor tubercle, and the internal intermuscular septum.

The opening for the popliteal artery is seen between the two portions, and the vertical portion is supplied by the great sciatic nerve, and the horizontal and oblique by the obturator nerve.

The **short head of the biceps** arises from the outer lip of the linea aspera of the femur, from the upper half of the external supracondylar ridge, and from the external intermuscular septum.

Vessels. Piercing the insertion of the adductor magnus are seen several vessels, the perforating branches of the profunda femoris artery, usually four in number, forming an anastomotic chain in the back of the thigh, which communicates with the circumflex vessels above and with the articular branches of the popliteal artery below.

The figures indicate—

1. Vastus externus muscle.
2. Short head of biceps flexor cruris muscle, and its insertion.
3. Adductor magnus muscle, vertical fibres.
4. Adductor magnus muscle, upper horizontal fibres (sometimes called adductor minimus).
5. Insertion of gluteus maximus muscle.
6. Tendons of semimembranosus and semitendinosus muscles.
7. Aperture in adductor magnus for femoral vessels.
8. Adductor gracilis muscle.
9. Sartorius muscle.
10. Tendon of adductor magnus,
11. Vastus internus muscle.
12. External intermuscular septum.
13. Trunk of great sciatic nerve.
14. Popliteal vessels.

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LOWER LIMB. ARTICULATIONS.

HIP JOINT—No. I.

PELVIC AND HIP JOINTS, SEEN FROM BEHIND.

I. The ligaments connecting the sacrum and the innominate bone on this aspect are seen to be as follows:—

The **oblique ligament** is attached above to the posterior superior spine of the ilium and below to the lateral tubercle of the third piece of the sacrum.

The **great** or **posterior sacro-sciatic ligament** is attached above to the posterior spines of the ilium, and to the outer borders and posterior surfaces of the lower three pieces of the sacrum and upper two pieces of the coccyx. Thence the fibres pass to be attached below to the inner border of the ischial tuberosity, and also pass forwards to the ramus of the ischium, where they form the **falciform process.** Some of the fibres are continued into the tendon of origin of the biceps muscle.

The **small** or **anterior sacro-sciatic ligament** springs by a wide attachment from the side of the lower part of the sacrum and from the coccyx. The ligament rapidly narrows, and is inserted into the spine of the ischium, its pelvic surface is intimately connected with the coccygeus muscle, and muscle fibres are often present in it.

These two ligaments limit the greater and lesser sacro-sciatic foramina.

II. In the **hip-joint**, the **ischio femoral band** is seen, the fibres of which, in the position of extension of this limb, wind round the back of the femur in a zonular manner.

The partial extent to which the posterior aspect of the neck of the femur is covered by the capsular ligament should be noticed. In front, the reflected tendon of the rectus femoris is seen joining the capsule.

The figures indicate:—

1. Posterior superior spine of the ilium.
2. Tubercle on crest of ilium.
3. Back part of the ischial tuberosity.
4. Great trochanter.
5. Oblique ligament.
6. Great sacro-sciatic ligament.
7. Small sacro-sciatic ligament.
8. Ischio-femoral band of capsule of the hip-joint.
9. Lower limit of capsule on the back of the neck of the femur.
10. Reflected tendon of the rectus femoris muscle.

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LOWER LIMB.

ARTICULATIONS, HIP-JOINT—No. 2.

The capsular ligament of the hip-joint is an extremely strong fibrous structure, strengthened in several parts by bands of fibres which are distinctively named.

It is attached to the innominate bone around the margin of the acetabulum, and to the transverse ligament which bridges over the notch in the margin, and, below, it is attached to the femur along the anterior intertrochanteric line and to the root of the great trochanter, while, behind, its attachment crosses the neck of the femur.

The principal bands on the anterior portion of the capsule are the ilio-femoral, the pubo-femoral, and the ischio-femoral. The first is attached above to the anterior inferior iliac spine, and divides into two limbs which pass to the upper and to the lower ends of the anterior intertrochanteric line, leaving between them a triangular interval, which is here very small in amount.

A band of fibres passing horizontally from the anterior inferior spine to the root of the great trochanter is often termed the ilio-trochanteric band.

To the inner side of the ilio-femoral band is a weak spot, where there is often an aperture communicating with the bursa under the ilio-psoas.

The **pubo-femoral** band is more horizontal in direction, passing from the pubic bone near the pectineal eminence, to join the capsule.

The **ischio-femoral** band consists of some fibres which pass from the ischium, below the acetabulum, and join the lower and back part of the capsule.

A small portion of the cotyloid ligament is seen. It is a rim of fibro-cartilage around the margin of the acetabulum.

The figures indicate—

1. Anterior inferior spine of ilium.
2. Ilio-trochanteric band.
3. Ilio-femoral band.
4. Lower part of ilio-femoral band.
5. Upper part of ilio-femoral band.
6. Cotyloid ligament.
7. Pubo-femoral band.
8. Ischio-femoral band.

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LOWER LIMB HIP JOINT. No. 2.
EDINBURGH STEREOSCOPIC ANATOMY





LOWER LIMB.

ARTICULATIONS, KNEE-JOINT—No. 1.

RIGHT KNEE-JOINT, VIEWED FROM IN FRONT.

The fibrous expansion from the quadriceps extensor which fills up the interval on each side of the ligamentum patellæ has been removed to show the synovial membrane and the edges of the semilunar cartilages.

The **ligamentum patellæ** is about two inches in length, and passes from the apex and lower border of the patella to the lower part of the anterior tubercle of the tibia. Some of its fibres are continuous with the tendon of the quadriceps. The ligament is separated from the joint by the infra-patellar pad of fat (which has been removed), and a bursa intervenes between it and the upper part of the tuberosity of the tibia.

The **synovial membrane of the knee-joint** is seen on each side passing upwards in the form of a pouch, in front of the lower end of the femur, and the extent to which it covers the front of the bone should be noticed.

The semilunar cartilages are attached to the head of the tibia along their margins by the **coronary ligament.** This has been removed from the outer cartilage, and the margins of the two cartilages are seen in the position in which they can be felt in the living subject. In relation to the joint on each side are seen the tendon of the *sartorius* muscle on the inner aspect, and that of the *biceps* on the outer.

The figures indicate—

1. Tendon of insertion of the quadriceps extensor muscle.
2. Patella.
3. Ligamentum patellæ.
4. Synovial membrane on the outer side.
5. Synovial membrane on the inner side.
6. Margin of the external semilunar cartilage.
7. Internal semilunar cartilage and coronary ligament.
8. Anterior tubercle of the tibia.
9. Tendon of the sartorius muscle.
10. Tendon of the biceps flexor cruris.

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LOWER LIMB.

ARTICULATIONS, KNEE-JOINT—No. 2.

TWO SPECIMENS OF THE RIGHT KNEE-JOINT, VIEWED FROM THE INNER SIDE.

The ligamentum patellæ has been isolated in A, and in B the tendons have been turned aside to show the internal lateral ligament.

On the inner side of the joint are found the tendons of the *sartorius*, *adductor gracilis* and *semitendinosus* muscles, passing down to be inserted into the upper part of the shaft of the tibia, while the tendon of the *semimembranosus* lies more posteriorly, and is inserted mainly into the inner tuberosity of the tibia.

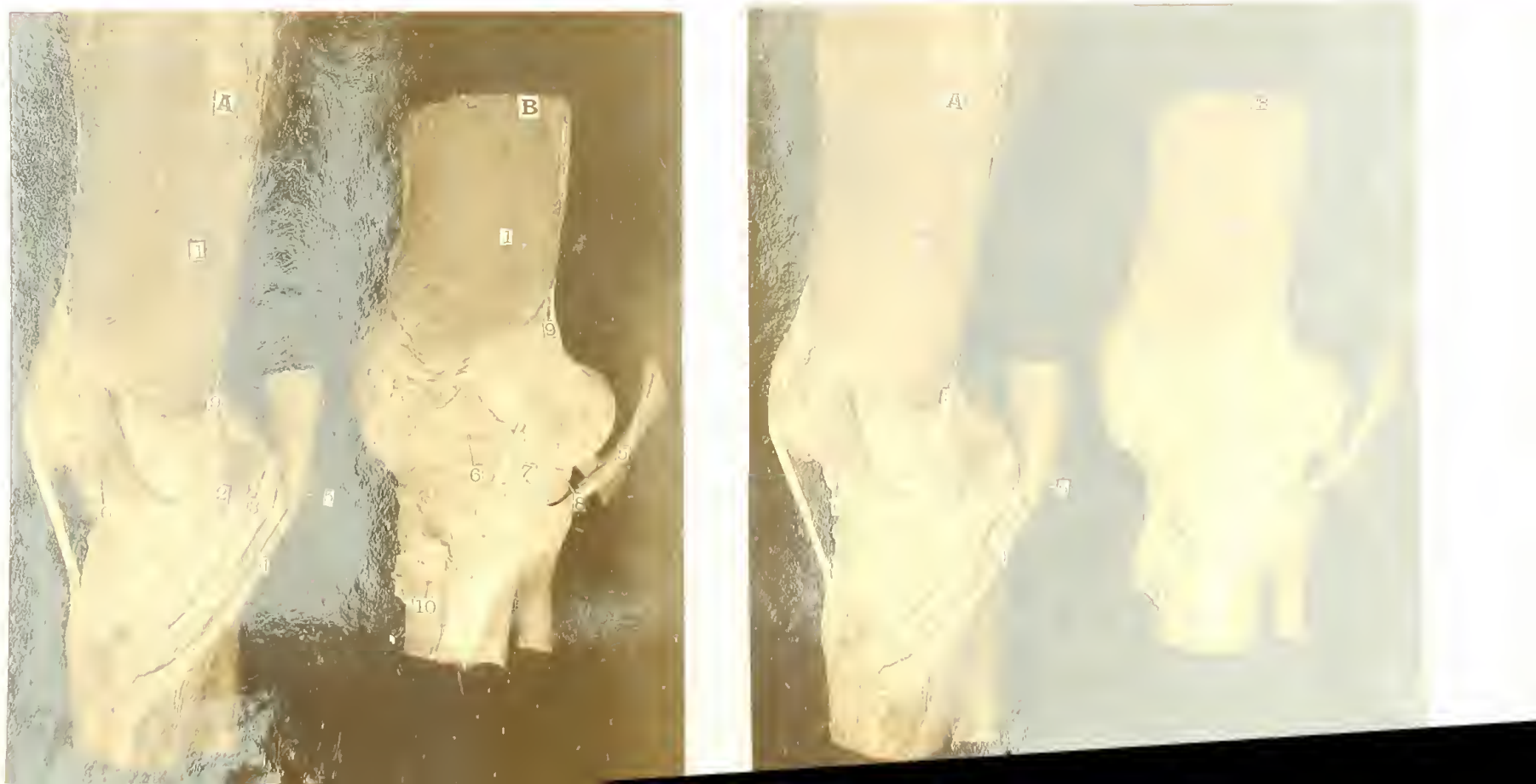
The **internal lateral ligament** is continuous above with the tendon of the adductor magnus, and probably represents a degenerated portion of that muscle. It is attached above to the internal condyle below the adductor tubercle, and passes as a wide, flat band down to the inner part of the shaft of the tibia, to which it is attached, below the internal tuberosity. A bursa intervenes between it and the tendons which lie upon its superficial surface.

The pouch of synovial membrane which passes up on the inner side in front of the lower end of the femur is well seen in A.

The figures indicate—

1. Vastus internus muscle.
2. Sartorius muscle.
3. Adductor gracilis muscle.
4. Semitendinosus muscle.
5. Semimembranosus muscle.
6. Pouch of synovial membrane.
7. Internal lateral ligament.
8. Internal semilunar cartilage.
9. Tendon of adductor magnus.
10. Bursa.

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LOWER LIMB ARTICULATIONS KNEE JOINT. No. 2.
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LOWER LIMB.

ARTICULATIONS, KNEE-JOINT—No 3.

RIGHT KNEE-JOINT, WITH TENDONS, ETC., FROM BEHIND.

The knee-joint is strengthened by the numerous tendons which pass over it on all sides. Thus on the inner side at the back are the tendons of the *semitendinosus*, *semimembranosus*, *adductor gracilis* and *sartorius*, with the inner head of the *gastrocnemius*, and on the outer side the *biceps*, outer head of the *gastrocnemius*, with the *plantaris*, and the *popliteus*.

The posterior ligament of the joint is further strengthened by a strong oblique band derived from the tendon of the *semimembranosus*.

The figures indicate—

1. Semimembranosus muscle and tendon.
2. Semitendinosus tendon.
3. Short head of the biceps, and its tendon of insertion.
4. Outer head of the gastrocnemius with the plantaris.
5. Inner head of the gastrocnemius.
6. and 7. Popliteus muscle.
8. Ligamentum posticum.
9. Tendon of the adductor magnus.
10. Vastus externus muscle.
11. Adductor gracilis tendon.
12. Sartorius muscle.
13. Origin of the extensor longus digitorum.

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LOWER LIMB.

ARTICULATIONS, KNEE-JOINT—No. 4.

RIGHT KNEE-JOINT FROM BEHIND.

The tendons and the posterior ligament have been removed to show the semilunar cartilages and the posterior crucial ligament.

The **posterior crucial ligament** is attached below to the back part of the head of the tibia, between the articular surfaces, and to the posterior aspect of the head, receiving also a slip from the external semilunar cartilage, and it passes upwards, forwards and inwards to be attached to the outer surface of the internal condyle in its anterior oblique part. The upper part of the **anterior crucial ligament** is seen ascending on the outer side of the former to be attached to the inner aspect of the external condyle near the back. On the outer side of the femur, the tendon of the popliteus muscle springs from the front of a groove on the outer aspect of the external condyle, under cover of the external lateral ligament, which is attached to a tubercle on the external condyle at a higher level, and passes down to the head of the fibula.

On the inner side the tendon of the *semimembranosus* has been turned aside to show a bursa which intervenes between it and the inner tuberosity of the tibia.

The figures indicate—

1. Posterior crucial ligament.
2. Internal semilunar cartilage.
3. External ,, ,,
4. External lateral ligament.
5. Tendon of the popliteus muscle.
6. Upper end of the anterior crucial ligament.
7. Tendon of the semimembranosus muscle.
8. Posterior superior tibio-fibular ligament.
9. Tendon of adductor magnus muscle.
10. Short head of biceps muscle.
11. External intermuscular septum and vastus externus muscle.

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LOWER LIMB ARTICULATIONS KNEE JOINT. No. 4.
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LOWER LIMB.

ARTICULATIONS, KNEE JOINT—No. 5.

HEAD OF TIBIA, WITH STRUCTURES IN POSITION.

A section has been made through the joint, and the lower end of the femur removed by dividing the crucial ligaments.

I. Behind the ligamentum patellæ is a pad of fat, covered by synovial membrane, from which a slender process passes to the intercondylar notch, the **ligamentum mucosum.** From its margin two folds pass outwards on each side, the **ligamenta alaria.** This fold covers the transverse ligament, which joins together the anterior ends of the semilunar cartilages.

II. The **semilunar cartilages** deepen the hollow for receiving the condyle of the femur on each side. They are narrow curved strips of fibro-cartilage, covered with synovial membrane on each side. The outer cartilage is nearly circular, while the inner is more semicircular in outline. They are firmly attached at each end to the head of the tibia, and also along the convex margin by the coronary ligaments, which pass to the margin of the head of that bone.

The margin of the internal cartilage is attached to the flat internal lateral ligament, but the external cartilage is separated from the external lateral ligament by the tendon of the popliteus muscle.

III. Attached to the head of the tibia in the mesial plane, from before backwards, lie—(1) the anterior end of the internal semilunar cartilage; (2) the anterior crucial ligament; (3) anterior end of the external semilunar cartilage; (4) posterior end of the same cartilage; (5) posterior horn of internal semilunar; (6) posterior crucial ligament.

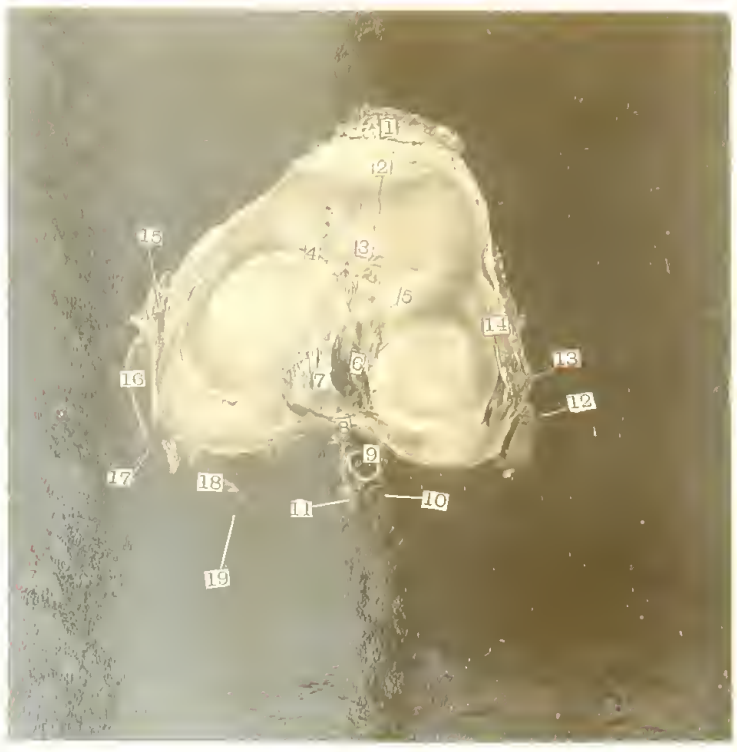
IV. The relation of the popliteal vessels to the posterior ligament of the joint should be noticed—the artery lying nearest to the ligament, but separated from it by some fatty tissue.

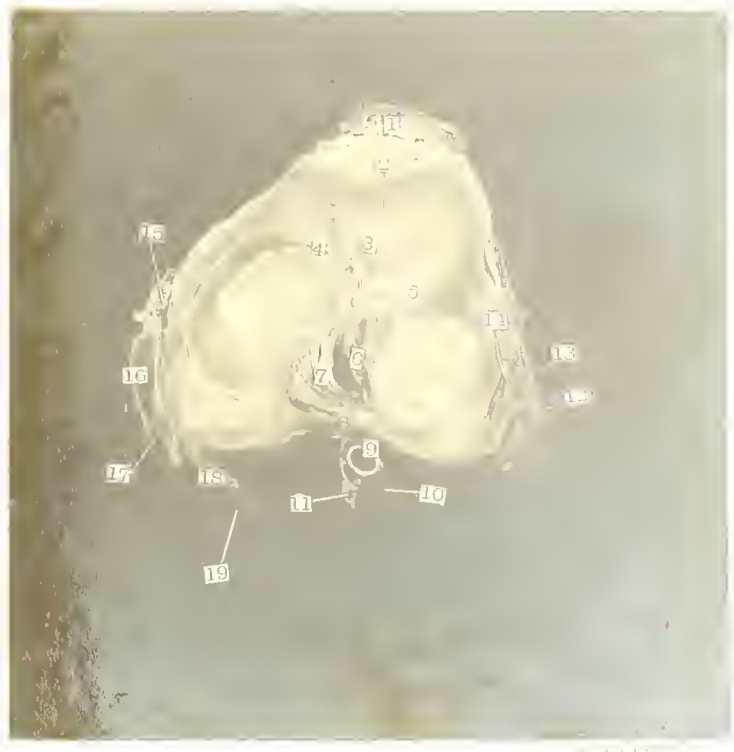
The figures indicate—

1. Ligamentum patellæ.
2. Retropatellar pad of fat.
3. Ligamentum mucosum.
4. Anterior end of internal semilunar cartilage.
5. Anterior end of external semilunar cartilage.
6. Anterior crucial ligament.
7. Posterior crucial ligament.
8. Posterior ligament of the knee-joint.
9. Poplitcal artery.
10. Popliteal vein.
11. Internal popliteal nerve.
12. Tendon of biceps.
13. External lateral ligament.
14. Tendon of popliteus.
15. Internal lateral ligament
16. Sartorius tendon.
17. Gracilis tendon.
18. Semitendinosus tendon.
19. Semimembranosus tendon.

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LOWER LIMB.

POPLITEAL SPACE.—No. 1.

THE SKIN AND SUPERFICIAL FASCIA HAVE BEEN REMOVED, TO SHOW THE DEEP FASCIA AND THE CUTANEOUS NERVES AND VESSELS IN THE POPLITEAL REGION OF THE LEFT LIMB.

In the roof of the popliteal space are found cutaneous branches of the small sciatic nerve, and the external and internal popliteal veins. The former vessel usually terminates by piercing the deep fascia about the middle of the space and joining the popliteal vein, which lies deeply.

Where it passes through the rigid opening in the deep fascia, it is liable to be constricted, and a varicose condition results, as shown here.

It is connected by cross-channels with the internal popliteal vein, which here is seen passing upwards behind the internal condyle of the femur.

The deep fascia is of considerable strength, and is composed largely of fibres passing across the limb, which retain the muscles and other structures in position.

Branches of the small sciatic nerve pierce the deep fascia at intervals, and extend down to the middle of the calf.

The figures indicate—

1. External or short saphenous vein.
2. and 3. Communicating channels.
4. Internal or long saphenous vein.
5. Aperture in the deep fascia transmitting the vein.
6. and 7. Branches of small sciatic nerve.

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LOWER LIMB.

POPLITEAL SPACE.—No. 2.

THE ROOF OF THE SPACE HAS BEEN REMOVED, WITH THE FAT AND LYMPHATIC GLANDS LYING IN THE SPACE.

The usual description of the popliteal space as a diamond-shaped area is hardly accurate. As there is practically no natural interval between the two heads of the gastrocnemius muscle, the space is more triangular in shape.

The upper and outer boundary is formed by the biceps muscle, and the upper and inner by the semimembranosus, a fleshy mass, on which lies the tendon of the semitendinosus, while further to the inner side are seen the adductor gracilis and the sartorius muscles.

The fleshy mass of the gastrocnemius fills up the lower part of the space.

Lying most superficially is the external popliteal nerve, close to the inner margin of the biceps, while the short saphenous nerve is formed high up in the space in this specimen, by the junction of two branches, or rami communicantes, from the external and internal popliteal nerves.

A vein of some size accompanies the nerve.

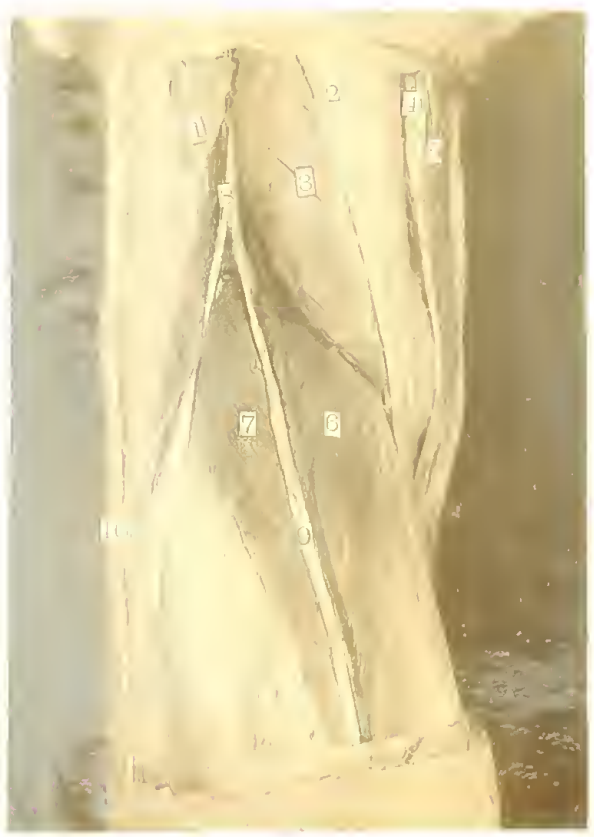
The other contents of the space are hidden from view by the belly of the semimembranosus.

The figures indicate—

1. Biceps flexor cruris muscle.
2. Semitendinosus muscle.
3. Semimembranosus muscle.
4. Adductor gracilis muscle.
5. Sartorius muscle.
6. and 7. Inner and outer heads of gastrocnemius muscle.
8. Bifurcation of great sciatic nerve.
9. External or short saphenous nerve.
10. External popliteal nerve.

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LOWER LIMB.

POPLITEAL SPACE—No. 3.

PORTIONS OF THE SEMIMEMBRANOSUS AND SEMITENDINOSUS MUSCLES HAVE BEEN REMOVED TO SHOW THE DEEPER LYING STRUCTURES.

The popliteal vessels are seen to lie under cover of the semimembranosus in the upper part of the space, with the internal popliteal nerve on their outer side.

At this level, they lie upon the popliteal surface of the femur, and to the inner side of this is seen the tendon of the adductor magnus muscle, with the superior internal articular artery passing inwards under it to the vastus internus muscle. There is a large bursa between the tendon of the semimembranosus and the back of the internal condyle, usually communicating with the knee-joint.

As the vessels and nerve pass downwards, they assume different relations, and come to lie in line from before backwards, the nerve being most superficial, and the artery remaining deepest in the space. This is their position as they pass between the heads of the gastrocnemius.

The figures indicate—

1. Semitendinosus (divided).
2. Semimembranosus (divided).
3. Sartorius.
4. Adductor gracilis.
5. Gastrocnemius.
6. Biceps.
7. Popliteal vein.
8. Popliteal artery.
9. Internal popliteal nerve.
10. External popliteal nerve.
11. Short saphenous nerve.
12. Long saphenous vein divided, with corresponding nerve beside it.
13. Adductor magnus.

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LOWER LIMB.

POPLITEAL SPACE—No. 4.

THE UPPER PART OF THE GASTROCNEMIUS MUSCLE HAS BEEN REMOVED, IN ADDITION TO THE FORMER DISSECTION.

The heads of the gastrocnemius are attached, the outer to the outer surface of the external condyle, and the inner above the internal condyle of the femur.

Under cover of the upper part of the muscle lie the plantaris, soleus, and popliteus muscles, and the popliteal vessels and internal popliteal nerve, with several branches.

The plantaris is attached to the back of the external condyle, and its short muscle belly is inserted into a long slender tendon.

The semimembranosus is inserted mainly into a horizontal groove on the back of the internal tuberosity of the tibia, but a strong slip is seen passing upwards and outwards as part of the posterior ligament of the knee, and it is also inserted into the fascia covering the popliteus muscle.

The popliteal artery rests successively upon the popliteal surface of the femur, the posterior ligament of the knee-joint, and the strong fascia covering the popliteus muscle.

The inferior internal articular vessels are seen passing obliquely downwards and inwards along the upper border of the popliteus muscle accompanied by an articular branch from the internal popliteal nerve.

The structures seen here are of the greatest importance in connection with swellings in the popliteal region, such as aneurism, neuroma, and enlarged bursae.

The figures indicate—

1. Biceps flexor cruris muscle.
2. Semitendinosus (divided).
3. Semimembranosus (divided).
4. Sartorius muscle.
5. Adductor gracilis.
6. Heads of gastrocnemius.
7. Soleus muscle.
8. Plantaris muscle.
9. Popliteus muscle.
10. External popliteal nerve.
11. Internal popliteal nerve. Some muscular branches to the gastrocnemius have been divided.
12. Popliteal vein, with the artery on its inner side.
13. Superior internal articular vessels.
14. Inferior internal articular vessels and nerve.
15. Head of fibula.

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LOWER LIMB.

FRONT OF LEG—No. 1.

THE PERONEAL AND EXTENSOR MUSCLES HAVE BEEN EXPOSED BY REMOVAL OF THE DEEP FASCIA.

On the outer side of the leg lies the peroneal group of muscles, consisting of the peroneous longus and peroneus brevis. These are separated by intermuscular septa from the posterior and anterior sets of muscles. The anterior set consists of the tibialis anticus and extensor longus digitorum and peroneus tertius muscles, which lie superficially, and of the extensor longus hallucis which lies deeply.

Peroneal muscles.—The peroneus longus arises from the head and upper two-thirds of the peroneal surface of the fibula, and the peroneus brevis from the lower part of that bone, and from the septa. The tendon of the peroneus longus at the ankle lies behind and external to that of the peroneus brevis, and the latter tendon passes forwards to be inserted into the base of the fifth metatarsal, while the peroneus longus tendon passes into the sole of the foot.

The peroneus tertius tendon is inserted into the upper aspect of the base of the fifth metatarsal.

The musculo cutaneous nerve becomes cutaneous in the interval between the peroneal and extensor muscles, piercing the deep fascia in the lower third of the leg.

The interval between the extensor longus digitorum and tibialis anticus muscles is indistinct in the upper part, but the position of the anterior peroneal intermuscular septum is indicated on the surface by a linear depression, whitish in colour.

The extensor longus digitorum and peroneus tertius muscles have practically one muscle belly, from which the tendon of peroneus tertius detaches itself just above the ankle joint.

The belly of the extensor brevis digitorum muscle, on the dorsum of the foot, arises from and conceals the front of the os calcis. It forms a distinct prominence which can be recognised beneath the skin, and which is sometimes mistaken for a pathological swelling.

The figures indicate—

Muscles and tendons—1. Soleus.
2. Peroneus longus.
3. Peroneus brevis.
4. Extensor longus digitorum.
5. Tibialis anticus.
6. Peroneus tertius.
7. Extensor brevis digitorum.
8. Extensor longus hallucis.
Muscles and tendons— 9. Peroneus brevis.
Ligaments, etc.—10. Anterior annular ligament.
11. Anterior peroneal septum.
Nerves and vessels—12. Musculo-cutaneous nerve.
13. Anterior peroneal vessels.
14. Dorsalis pedis vessels.
15. External saphenous nerve and vein.

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LOWER LIMB.

FRONT OF LEG—No. 2.

PORTIONS OF THE TIBIALIS ANTICUS AND EXTENSOR LONGUS DIGITORUM MUSCLES HAVE BEEN REMOVED, IN ORDER TO EXPOSE THE DEEPER STRUCTURES.

The **extensor longus hallucis** muscle takes origin from the middle two-fourths of the anterior surface of the shaft of the fibula, behind the extensor longus digitorum and from the interosseous membrane, and it is inserted into the base of the terminal, and frequently also into the proximal, phalanx of the great toe.

The **anterior tibial artery** comes into this region by passing through an opening in the interosseus membrane, between the bones of the leg, and passes down on the interosseus membrane and on the tibia to the front of the ankle-joint.

It is therefore deeply placed in the upper part of the leg, between the tibialis anticus on the inner side, and the extensor longus digitorum and extensor longus hallucis on the outer, but, lower down, the latter muscle crosses it, and its tendon lies to the inner side of the artery at the ankle.

The artery gives off an anterior tibial recurrent branch, as well as muscular branches, and, near the ankle, gives off two malleolar branches.

The **anterior tibial nerve**, a branch of the external popliteal, begins at the neck of the fibula, and joins the corresponding artery by piercing the extensor longus digitorum muscle. It runs down in company with the artery, giving branches to all the muscles in this compartment of the leg, and an articular branch to the ankle-joint.

The relations of the nerve and artery in the lower part are seen in the view of the Dorsum of the Foot. No. 3.

The figures indicate—

Muscles. 1. Tibialis anticus, origin.
2. Peroneus brevis.
3. Peroneus tertius.
4. Extensor longus hallucis.
5. Extensor longus digitorum.

Vessels, etc. 6. Anterior tibial vessels.
7. Anterior tibial nerve.
8. Interosseous membrane.
9. Tendon of extensor longus digitorum.
10. Tendon of tibialis anticus.
11. Museulo-cutaneous nerve.
12. Anterior peroneal vessels.

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LOWER LIMB.

DORSUM OF FOOT—No. 1.

THE SUPERFICIAL STRUCTURES ARE EXPOSED, LYING ON THE DEEP FASCIA.

1. **Cutaneous nerves.**—The cutaneous part of the musculo-cutaneous nerve pierces the deep fascia in the lower third of the leg, and divides into two portions, inner and outer. The outer is here very small, and, as often occurs, its place is largely taken by a large branch from the external saphenous nerve which supplies the outer two and a half toes. The inner division supplies the inner side of the great toe, and the adjacent sides of the second and third toes, and communicates with the internal saphenous nerve on the inner side of the foot, and with a branch of the anterior tibial nerve which appears in the interval between the first and second toes, and supplies their adjacent sides.

The external saphenous nerve passes below the external malleolus, and extends along the outer side of the foot and little toe.

The internal saphenous nerve is much smaller, and passes in front of the internal malleolus to the middle of the inner side of the foot.

2. **Superficial veins.**—At the base of the toes is a venous arch which receives digital tributaries, and in this case gives origin on the inner side to the internal saphenous vein, and usually, but not here, on the outer side to the external saphenous vein. These veins pass up the leg in company with the nerves which bear the same names.

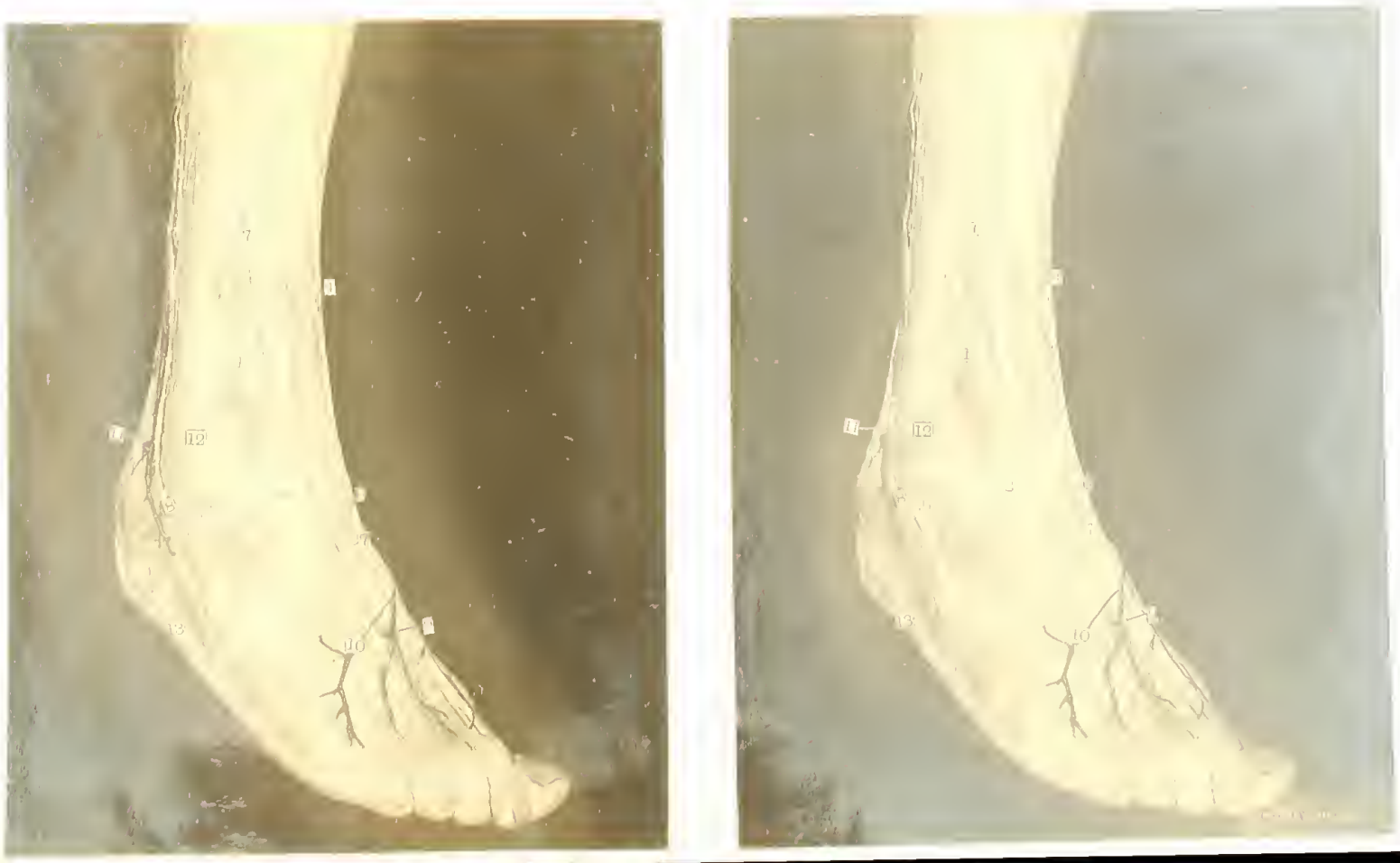
3. **Deep fascia.**—The deep fascia forms a strong covering for the muscles, etc., of the lower part of the leg, and is specially thickened in places to form the anterior annular ligament (see No. 2).

The figures indicate—

1. Anterior annular ligament, upper band.
2. Anterior annular ligament, lower band.
3. Extensor communis digitorum tendon.
4. Tibialis anticus tendon.
5. Peroneus brevis tendon.
6. Extensor proprius hallucis tendon.
7. Musculo-cutaneous nerve.
8. External saphenous nerve.
9. Branch of anterior tibial nerve.
10. Venous arch on dorsum of foot.
11. External saphenous vein.
12. External malleolus.
13. Base of fifth metatarsal bone.

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LOWER LIMB.

DORSUM OF FOOT.—No. 2.

THE DEEP FASCIA HAS BEEN REMOVED, LEAVING THE TWO PORTIONS OF THE ANTERIOR ANNULAR LIGAMENT IN POSITION.

The **anterior annular ligament** consists of two parts, an upper and a lower. The upper is a broad band which stretches across the front of the leg, above the ankle, and is attached externally to the fibula and internally to the tibia.

The lower part is Y-shaped, and is attached externally to the front of the os calcis. It divides into two bands, which are attached, the upper to the internal malleolus, while the lower blends with the plantar fascia on the inner side of the foot.

The tendons of the long extensor muscles are retained in position by these bands, and pass through channels in them, which are lined by synovial membrane.

In the upper portion there is one such channel for the tendon of the tibialis anticus on the inner side, and one for the other extensor tendons on the outer.

In the lower portion there are three separate channels, an inner for the tendon of the tibialis anticus, a middle one for the extensor longus hallucis, and an outer one for the extensor longus digitorum and peroneus tertius tendons.

Vessels.—The anterior division of the peroneal artery is seen coming to the front of the ankle between the two bones of the leg, to take part in the anastomosis on the outer side of the ankle. The dorsalis pedis is seen lying on the dorsum of the foot between the tendons of the extensor longus hallucis and extensor longus digitorum muscles.

The figures indicate—

1. Anterior annular ligament, upper portion.
2. Anterior annular ligament, lower portion.
3. Peroneus tertius muscle.
4. Extensor longus digitorum tendon.
5. Extensor longus hallucis tendon.
6. Tibialis anticus tendon.
7. Peroneus brevis tendon.
8. Extensor brevis digitorum muscle.
9. Dorsalis pedis artery.
10. Anterior tibial nerve, terminal branch.
11. Anterior peroneal vessels.
12. External saphenous nerve.

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LOWER LIMB.

DORSUM OF FOOT—No. 3.

THE TENDONS ON THE FRONT OF THE ANKLE HAVE BEEN TAKEN AWAY, AND A PORTION OF THE EXTENSOR BREVIS DIGITORUM HAS BEEN REMOVED, TO SHOW THE DEEPER STRUCTURES.

The **anterior tibial nerve** ends by dividing into an internal and an external branch. The internal branch passes forwards on the outer side of the dorsalis pedis artery, gives a branch which passes outwards and supplies the tarso-metatarsal and the metatarso-phalangeal joints, and then becomes cutaneous in the first intermetatarsal space.

The external branch passes outwards under the extensor brevis digitorum and supplies that muscle and the adjacent joints.

Twigs which pass from the nerve to the first and second dorsal interosseous muscles are said to be sensory in character, and not motor to these muscles.

The **malleolar branches** of the anterior tibial artery are seen, the external passing outwards to anastomose with the anterior division of the peroneal artery, and the inner passing to anastomose with internal calcanean branches on the inner side of the heel.

The relation of the anterior tibial nerve and artery in the lower part of the leg is seen. The nerve lies in front of the artery above, but passes again to its outer side in front of the ankle-joint, and gives off a fine articular branch to the ankle just before dividing into its terminal branches.

The figures indicate:—

Muscles, etc.
1. Extensor brevis digitorum.
2. Peroneus tertius.
3. Extensor longus digitorum.
4. Peroneus brevis.
5. Tibialis anticus.

Nerves.
6. External saphenous.
7. Anterior tibial.
8. Anterior tibial, outer division.
9. Anterior tibial, inner division.

Vessels.
10. Anterior tibial vessels.
11. Anterior peroneal vessels.
12. Tarsal vessels.

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LOWER LIMB.

INNER SIDE OF ANKLE—No. 1.

INTERNAL ANNULAR LIGAMENT AND THE STRUCTURES RELATED TO IT.

The upper portion of the ligament has been removed to show the vessels, etc. under cover of it. A portion of the abductor hallucis muscle has also been taken away to show the structures as they pass into the sole of the foot.

The **internal annular ligament** is a strong band which passes from the internal malleolus to the inner side of the os calcis. Like the other annular ligaments, it is continuous with the adjacent portions of the deep fascia, and it is also strengthened by fibres from the fascia covering the deep layer of muscles of the leg.

The internal calcanean vessels and nerves are seen coming through the ligament and are distributed to the tissues of the heel.

Under cover of the ligament, and retained in position by it, are the tendons of the tibialis posticus, flexor longus digitorum, and flexor longus hallucis muscles, while the posterior tibial vessels and nerve lie between the latter two tendons. The tendons are invested by separate synovial sheaths. The nerve lies on the outer side of the artery, and the vessels and nerve divide at the lower border of the ligament into the internal and external plantar branches.

The relations of the tendons in this region are of great importance in connection with the operation of tenotomy for club foot, and the vessels and nerves should be noticed with reference to Syme's amputation of the foot.

The figures indicate—

1. Internal malleolus.
2. Tuberosity of scaphoid.
3. Os calcis.
4. Portion of deep fascia between superficial and deep muscles of the leg.
5. Lower part of internal annular ligament.
6. Tendon of tibialis posticus.
7. Tendon of flexor longus digitorum.
8. Tendon of flexor longus hallucis.
9. Abductor hallucis muscle.
10. Musculus accessorius.
11. Tibialis anticus tendon.
12. Plantaris tendon.
13. Posterior tibial vessels.
14. External plantar vessels.
15. Internal plantar vessels.

16 and 17. Internal saphenous vein.

18. Internal saphenous nerve.
19. Posterior tibial nerve.
20. Internal plantar nerve.

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LOWER LIMB.

BACK OF LEG.—No. 1.

THE SKIN, LAYERS OF FASCIA AND SUPERFICIAL STRUCTURES HAVE BEEN REMOVED, TO SHOW THE MUSCLES.

The gastrocnemius muscle arises by two heads from the lower end of the femur (see Popliteal Space, No. 2.). The inner head is the larger of the two and extends further down, and the two heads are inserted into a flattened, thin tendon, into which the fibres of the soleus muscle also are inserted.

This tendon narrows as it passes down, becomes thicker and forms the tendo Achillis, which is inserted into an impression on the back of the os calcis, below a smooth area, which is in contact with a bursa separating the tendon from the upper part of the bone.

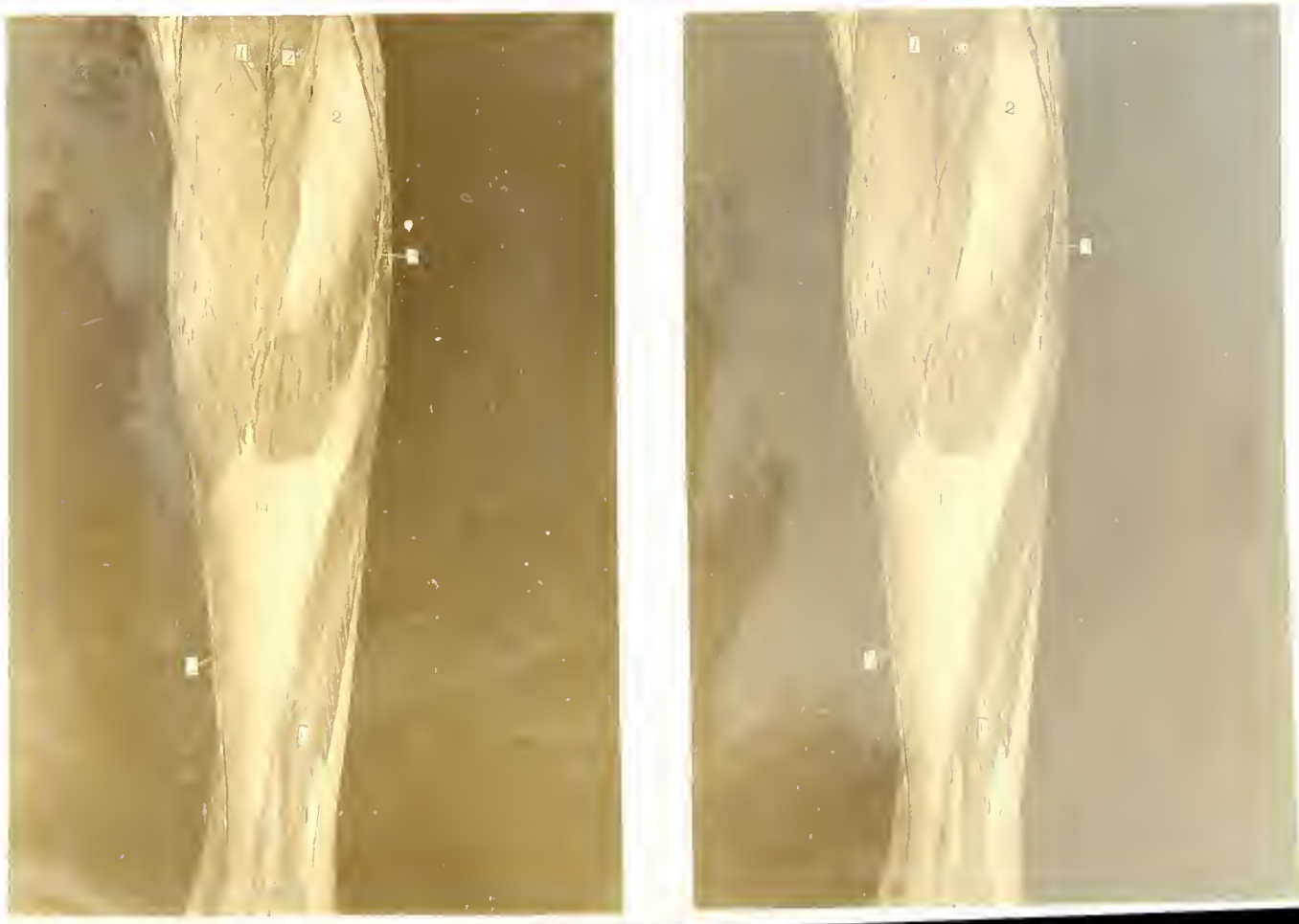
The tendon of the plantaris makes its appearance below the middle of the leg on the inner side of the tendo Achillis, emerging from between the gastrocnemius and soleus, and it passes down by the side of that tendon, to be inserted separately into the posterior part of the os calcis.

The outer margin of the tendo Achillis receives fibres of the soleus muscle till within a short distance of the heel.

The figures indicate—

1. Inner head of gastrocnemius.
2. Outer head of gastrocnemius.
3. Soleus.
4. Tendon of gastrocnemius.
5. Plantaris.
6. Peroneus longus.

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LOWER LIMB BACK OF LEG. No. 1.
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LOWER LIMB.

BACK OF LEG—No. 2.

THE GASTROCNEMIUS, PLANTARIS, AND SOLEUS HAVE BEEN REFLECTED TO SHOW THE DEEPER LYING GROUP OF MUSCLES.

The **soleus** arises from both of the bones of the leg, and from a fibrous arch between them. It is attached to the head and to the upper third of the posterior surface of the shaft of the fibula, and to the oblique line of the tibia and to the inner border of the shaft in its upper half, and it is inserted into the tendo Achillis.

The posterior tibial vessels and nerve pass down between these two heads of origin, and are covered by the fibrous arch from which also the muscle takes origin.

Under cover of the soleus lie the flexor longus digitorum on the inner side, the flexor longus hallucis on the outer side, and the tibialis posticus between them, covered by the flexor longus hallucis, with the posterior tibial nerve and vessels with their branches.

The flexor longus digitorum arises from the inner part of the posterior surface of the tibia, below the oblique line, down to within a short distance of the lower end of the bone.

The flexor longus hallucis, on the other hand, arises from the lower two-thirds of the outer portion of the posterior surface of the fibula. Both muscles also take origin from the fibrous membranes beside them, *i.e.* the fascia covering the tibialis posticus, and the posterior peroneal septum. The tibialis posticus is concealed from view by the flexor longus hallucis. (See No. 3.)

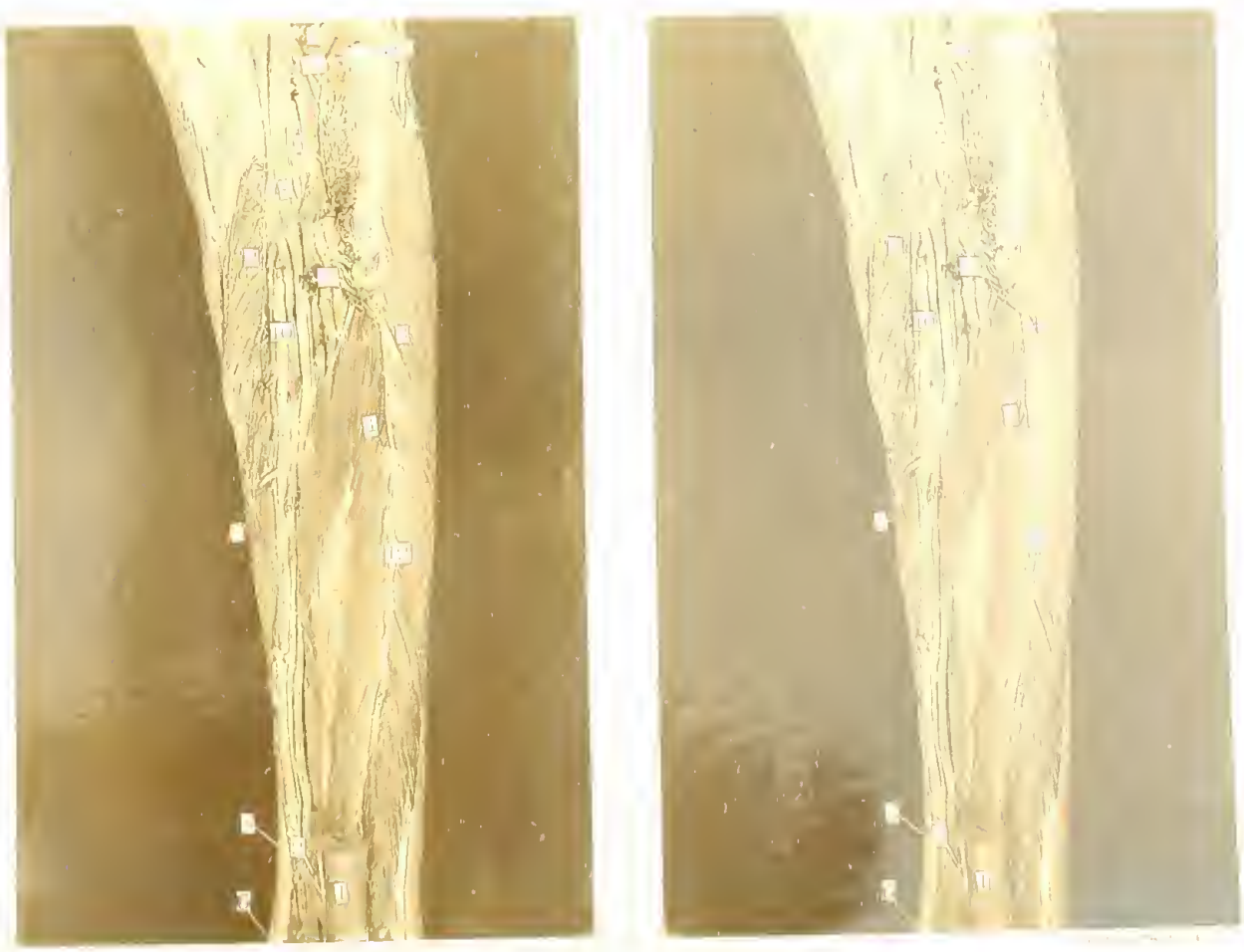
The figures indicate—

Muscles, etc.
1. Tendo Achillis.
2. Soleus.
3. Peroneus longus.
4. Flexor longus hallucis.
5. Flexor longus digitorum.
6. Tibialis posticus.
7. Popliteus.

Nerves, etc.
8. Posterior tibial nerve.
9. Muscular branches.
10. Posterior tibial vessels.
11. Peroneal vessels.
12. Posterior peroneal septum.
13. Nerve to popliteus.
14. External popliteal nerve.

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LOWER LIMB.

BACK OF LEG—No. 3.

THE FLEXOR LONGUS HALLUCIS MUSCLE HAS BEEN REMOVED, TO SHOW THE PERONEAL VESSELS, ETC.

The **tibialis posticus** muscle takes origin from both tibia and fibula, from the fascia which covers it, and from the interosseous membrane.

The surfaces of the two bones to which it is attached lie beside the interosseous ridge, and extend on each side laterally as far as to the origin of the flexor longus digitorum on the tibia, and to that of the flexor longus hallucis on the fibula.

The relations of its tendon are seen in another view (Inner Side of Ankle, No. 1).

The **posterior tibial artery** begins at the lower border of the popliteus muscle, and is the larger of the two terminal branches of the popliteal artery. It passes downwards on the surface of the flexor longus digitorum and tibialis posticus muscles, and then it comes to lie on the back of the tibia and of the ankle-joint, as these two muscles pass to its inner side. It is covered above by the gastrocnemius and soleus, but in the lower part it lies immediately below the deep fascia, and it is accompanied by the posterior tibial nerve, which is the direct continuation of the internal popliteal nerve. The nerve is, throughout, superficial to the artery, and lies to the inner side above, but soon crosses and lies on the outer side for nearly its whole length.

The artery gives off high up a large **peroneal** branch, which runs outwards and downwards in the substance of the flexor longus hallucis muscle, and it also gives off muscular and cutaneous branches and a nutrient artery to the tibia, and it communicates with the peroneal artery in the lower part of the leg by a transverse communicating branch. A calcanean branch is given off just above the ankle joint.

The peroneal artery gives off muscular branches, and a nutrient artery to the fibula.

Each of these large vessels is accompanied by two venæ comites, which are closely connected to the artery, are of large size, and communicate freely across the intervening artery by cross branches.

The posterior tibial nerve supplies all three deep muscles, and gives an articular branch to the ankle joint

The terminal branches of the vessels and nerves, and their further relations, are seen in the views of the ankle.

The figures indicate—

Muscles.	1. Soleus.	Muscles.	5. Peroneus longus.	Vessels, etc.	9. Communicating artery.
	2. Flexor longus digitorum.	Vessels, etc.	6. Posterior tibial vessels.		10. Division of peroneal artery.
	3. Tibialis posticus.		7. Peroneal vessels.		
	4. Flexor longus hallucis.		8. Posterior tibial nerve.		

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LOWER LIMB BACK OF LEG. No. 3.
EDINBURGH STEREOSCOPIC ANATOMY





LOWER LIMB.

SOLE OF FOOT—No. 1.

SUPERFICIAL DISSECTION.

The skin and superficial fascia have been removed from the sole to show the deep fascia and the cutaneous nerves and vessels.

The **superficial fascia** of the sole is thick and dense, consisting of a quantity of fat, arranged in lobules in a network of strong connective tissue. At the root of the toes, the connective tissue framework is arranged in a series of transverse bands, which constitute the superficial transverse ligament of the toes.

The **deep**, or **plantar fascia** is a strong sheet of fibrous tissue, which covers the superficial muscles of the sole, and which in many respects is similar to the palmar fascia.

The central portion (3) is very strong, and is triangular in shape. It is attached behind to the internal tuberosity of the os calcis, covers the flexor brevis digitorum muscle, and in front, divides into five slips which pass to the toes. Between these slips the digital vessels and nerves and the lumbrical muscles emerge.

The lateral parts of the plantar fascia are much weaker.

The outer (4) invests the abductor minimi digiti muscle, and in connection with it a strong band passes from the outer tuberosity of the os calcis to the base of the fifth metatarsal bone.

The inner portion (5) is a thin sheet, covering the abductor hallucis muscle.

The digital nerves which supply the toes have the following origin:—on the inner side of the foot is a branch from the internal plantar nerve, supplying the inner margin of the great toe, and cutaneous branches from the same nerve make their appearance in the adjacent three interspaces, and run forward to supply the sides of the toes which bound the spaces, while on the outer side of the foot is found a cutaneous branch from the external plantar nerve, and in the adjacent space is a branch from the same nerve, which supplies the adjacent sides of the fourth and fifth toes.

Small digital vessels accompany these nerves.

The figures indicate—

1. Os calcis, posterior part.
2. Base of fifth metatarsal bone.
3. Central part of plantar fascia.
4. External part of plantar fascia.
5. Internal part of plantar fascia.
6. Division of central portion of fascia into slips.
7. Superficial transverse ligament of the toes.
8. Cutaneous branch of external plantar nerve.
9. Cutaneous branch of internal plantar nerve.
10. Digital artery and nerve running in company.

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LOWER LIMB.

SOLE OF FOOT—No. 2.

FIRST LAYER. THE DEEP FASCIA HAS BEEN REFLECTED, TO EXPOSE THE FIRST LAYER OF MUSCLES.

The muscles and tendons in the sole are arranged in four layers, of which this is the first or most superficial.

The **abductor hallucis muscle**, on the inner side, takes origin from the inner tubercle of the os calcis, and from the adjacent internal annular ligament, plantar fascia, and intermuscular septum, and is inserted into the base of the first phalanx of the great toe, where fibres of the flexor brevis hallucis are blended with its tendon.

The **flexor brevis digitorum** arises from the inner tubercle of the os calcis, and from the plantar fascia and the intermuscular septa on either side, and ends in four tendons which pass to the four outer toes, and which are inserted in the same manner as the tendons of the flexor sublimis digitorum in the upper limb, to which it corresponds.

The **abductor minimi digiti** arises from both of the inferior tubercles of the os calcis, under cover of the flexor brevis digitorum, and from the adjacent bands of fascia, and is inserted into the outer aspect of the base of the proximal phalanx of the little toe. A portion of the muscle is frequently inserted into the base of the fifth metatarsal, forming the abductor ossis metatarsi quinti digiti.

The arch formed by the internal plantar nerve on the surface of the flexor brevis should be noted, but the blood vessels and nerves are more fully exposed in No. 3.

The short muscles play a part in supporting the arch of the foot, and the so-called abductor muscles have probably no action such as their name would indicate.

The figures indicate—

Muscles, etc.
1. Tuberosity of os calcis.
2. Abductor minimi digiti.
3. Flexor brevis digitorum.
4. Abductor hallucis.
5. Outermost lumbrical.
6. Flexor longus hallucis tendon.

Nerves and blood vessels.
7. External plantar nerve and artery.
8. Inner digital branch of internal plantar nerve.
9. Outer branch of internal plantar nerve.
10. External plantar digital nerve.

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LOWER LIMB.

SOLE OF FOOT—No. 3.

SECOND LAYER.

The muscles of the first layer have been reflected, to show the second layer, and the blood-vessels and nerves.

The second layer includes the musculus accessorius, the lumbricals, and the long flexor tendons.

The **musculus accessorius** arises by two heads, from the inner and outer aspects of the os calcis, and from the long plantar ligament between them, and is inserted into the tendon of the flexor longus digitorum.

The tendon of the **flexor longus digitorum** widens out in the sole into a flat fibrous band from which four tendons pass to the four outer toes, and are inserted, in the same way as the tendons of the flexor profundus digitorum in the upper limb, into the base of the terminal phalanges.

The tendon of the **flexor longus hallucis** passes under cover of this tendon, and sends a slip to it, and passes on the surface of the flexor brevis hallucis to the base of the terminal phalanx of the great toe.

Nerves and vessels. The **external plantar artery,** which is larger than the internal, passes obliquely across the sole, with the corresponding nerve, on the surface of the musculus accessorius, to the interval between the flexor brevis digitorum and the abductor minimi digiti. Here it dips down into the sole, and forms the plantar arch. In this part, it gives off only some branches to the adjacent muscles and superficial tissues.

The **external plantar nerve** resembles the ulnar nerve in the hand as regards its cutaneous distribution. It supplies the musculus accessorius and the abductor minimi digiti, and at the base of the fifth metatarsal it divides into a superficial and a deep branch, the superficial branch dividing into two others, which supply (1) the outer side of the little toe, and the flexor brevis minimi digiti and muscles of the fourth interosseous space, and (2) the adjacent sides of the fourth and fifth toes, respectively.

The inner branch communicates with an adjacent branch from the internal plantar nerve. The deep division accompanies the plantar arch.

The **internal plantar artery** is usually very small, and often ends, as here, on the inner side of the great toe, though it is usually described as giving three digital branches, which accompany the branches of the internal plantar nerve to the toes, as well as branches to the skin and muscles near it and on the inner side of the sole.

The **internal plantar nerve** runs forwards with the artery, and gives off four large digital branches, as seen. It gives muscular branches to the abductor hallucis and flexor brevis digitorum, while the inner digital branch supplies the flexor brevis hallucis, and the adjacent branch the first lumbrical muscle.

The figures indicate—

Muscles. 1. Tuberosity of os calcis.
2. Abductor minimi digiti.
3. Tendon of flexor brevis and flexor longus digitorum.
4. Abductor hallucis.
5. Musculus accessorius outer head.
6. Musculus accessorius inner head.
7. Flexor longus digitorum and lumbricals.
Muscles. 8. Flexor longus hallucis.
9. Flexor brevis hallucis.
Nerves. 10. External plantar.
Vessels. 11. N. to abductor minimi digiti.
etc. 12. Internal plantar nerve.
13. Internal plantar artery.
14. Abductor ossis metatarsi quinti digiti (insertion).

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LOWER LIMB.—SOLE OF FOOT—No. 4.

PLANTAR ARCH AND FOURTH LAYER.

The second layer of muscles and portions of the adductor obliquus hallucis and flexor brevis hallucis have been removed.

The third layer of the sole contains the following muscles :—

Flexor brevis minimi digiti arises from the base of the fifth metatarsal and the sheath of the peroneus longus, and is inserted into the outer side of the base of the proximal phalanx of the little toe.

Flexor brevis hallucis arises from the cuboid bone and from a slip of the tendon of the tibialis posticus.

The **adductor obliquus hallucis** arises from the bases of the 2nd, 3rd, and 4th metatarsals and the sheath of the peroneus longus tendon.

The **adductor transversus hallucis** arises from the inferior metatarso-phalangeal ligaments of the 3rd, 4th, and 5th toes.

The **insertion** of these muscles is as follows—the flexor brevis hallucis divides into two tendons, in which large sesamoid bones are developed, and which are inserted into the sides of the first phalanx of the great toe. The inner tendon joins the tendon of the abductor hallucis, and the outer is joined by the tendons of the transverse and oblique adductor muscles.

In the fourth layer are found the interosseous muscles and the tendons of the peroneus longus and tibialis posticus muscles.

The **peroneus longus** passes obliquely across the sole to be inserted into the internal cuneiform and base of the first and sometimes also the second metatarsal bones, while the **tibalis posticus** is inserted principally into the tubercle of the scaphoid, but sends slips forwards to the bases of the 2nd, 3rd, and 4th metatarsal bones, and to the os calcis, cuboid, and cuneiform bones.

The **plantar arch** runs deeply across the sole from the base of the fifth metatarsal bone to the first interosseous space where it is joined by the dorsalis pedis, and gives off four digital branches, which go to the outer side of the little toe and to the three adjacent spaces,—some articular branches and three posterior perforating which ascend to the dorsum of the foot. The arteria magna hallucis is seen in the first interosseous space as a branch from the dorsalis pedis in the sole.

The **deep division** of the **external plantar nerve** runs with the plantar arch, and gives off muscular branches to adductors, transversus, and obliquus, to the three outer lumbricals, and to the interosseous muscles of the three inner spaces.

The figures indicate—

1. Tuberosity of os calcis.
2. Base of fifth metatarsal.
3. Base of first metatarsal.
4. Long plantar ligament.
5. Tendon of peroneus longus.
6. Tendon of tibialis posticus.
7. Flexor longus hallucis.
8. Flexor longus digitorum.
9. Internal plantar nerve.
10. External plantar nerve.
11. Flexor brevis minimi digiti.
12. Adductor obliquus hallucis.
13. Adductor transversus.
14. Sesamoid bones of flexor brevis hallucis.
15. Deep plantar arch and nerve.
16. Arteria magna hallucis.
17. Prolongations of tendon of tibialis posticus.

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LOWER LIMB.

ARTICULATIONS, ANKLE AND FOOT—No. 1.

LIGAMENTS SEEN ON THE OUTER SIDE.

The ligaments which connect the leg with the foot, and the different bones of the skeleton of the foot with one another are extremely numerous, and vary considerably in their comparative strength and importance.

1. **Ankle-joint.**—The anterior ligament was represented here by a strong band of fibrous tissue passing from the front of the tibia to the neck of the astragalus, and the remainder of the capsule in this aspect was very thin and indefinite.

The external lateral ligament is represented by three bands, an anterior in two fasciculi, a middle, and a posterior (*vide* No. 3), of which the anterior passes to the neck of the astragalus and the middle to the outer surface of the os calcis. The different bands are attached above to the external malleolus.

2. **Foot.**—The astragalus is connected to the os calcis and to the scaphoid on this aspect by the interosseous ligament, a strong band whose margin is seen at the bottom of the sinus pedis, or tarsal pit, by the external astragalo-calcanean, and by a dorsal astragalo-scaphoid band. Further forward is a ligament uniting the os calcis and cuboid bones on their dorsal and outer aspect, and in front, are the numerous bands, variable in their size, uniting the scaphoid and cuneiform bones, and metatarsals together (not defined).

The figures indicate—

1. Anterior inferior tibio-fibular ligament.
2. External ligament of ankle, anterior band.
3. External ligament of ankle, middle band.
4. Outer edge of interosseous ligament.
5. Anterior annular ligament divided.
6. External astragalo-calcanean ligament.
7. Anterior ligament of ankle.
8. Dorsal astragalo-scaphoid ligament.
9. External calcaneo-scaphoid ligament.

10 and 11. Superior calcaneo-cuboid ligament.

12. External calcaneo-cuboid ligament.
13. Long plantar ligament.
14. Dorsal scapho-cuneiform ligament.
15. Peroneus longus tendon.

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LOWER LIMB ANKLE JOINT. No. 1.

EDINBURGH STEREOSCOPIC ANATOMY





LOWER LIMB.

ARTICULATIONS, ANKLE AND FOOT—No. 2.

LIGAMENTS SEEN ON THE INNER SIDE.

1. Ankle.—The internal lateral ligament is a strong triangular band which radiates from the under part of the internal malleolus, and is attached to the scaphoid bone in front, and then to the astragalus, sustentaculum tali of the os calcis, and to the astragalus again at the back.

2. Foot.—Several important bands are seen on this aspect. Below the internal lateral ligament is the inferior calcaneo-scaphoid or spring ligament, so called from its action in maintaining the antero-posterior arch of the foot, by supporting the head of the astragalus. The ligament is covered in part by the tendon of the tibialis posterior muscle,—a bursa intervening,—and it is attached behind and below to the front of the sustentaculum tali, and its fibres pass in spiral fashion to the under and inner parts of the scaphoid bone.

On the under aspect of the foot are seen the long and short plantar ligaments. The former is attached to the under surface of the os calcis in front of the tuberosities, and passes forwards to be attached to the under surface of the cuboid, from which fibres are continued forwards to be attached to the bases of the three middle metatarsal bones.

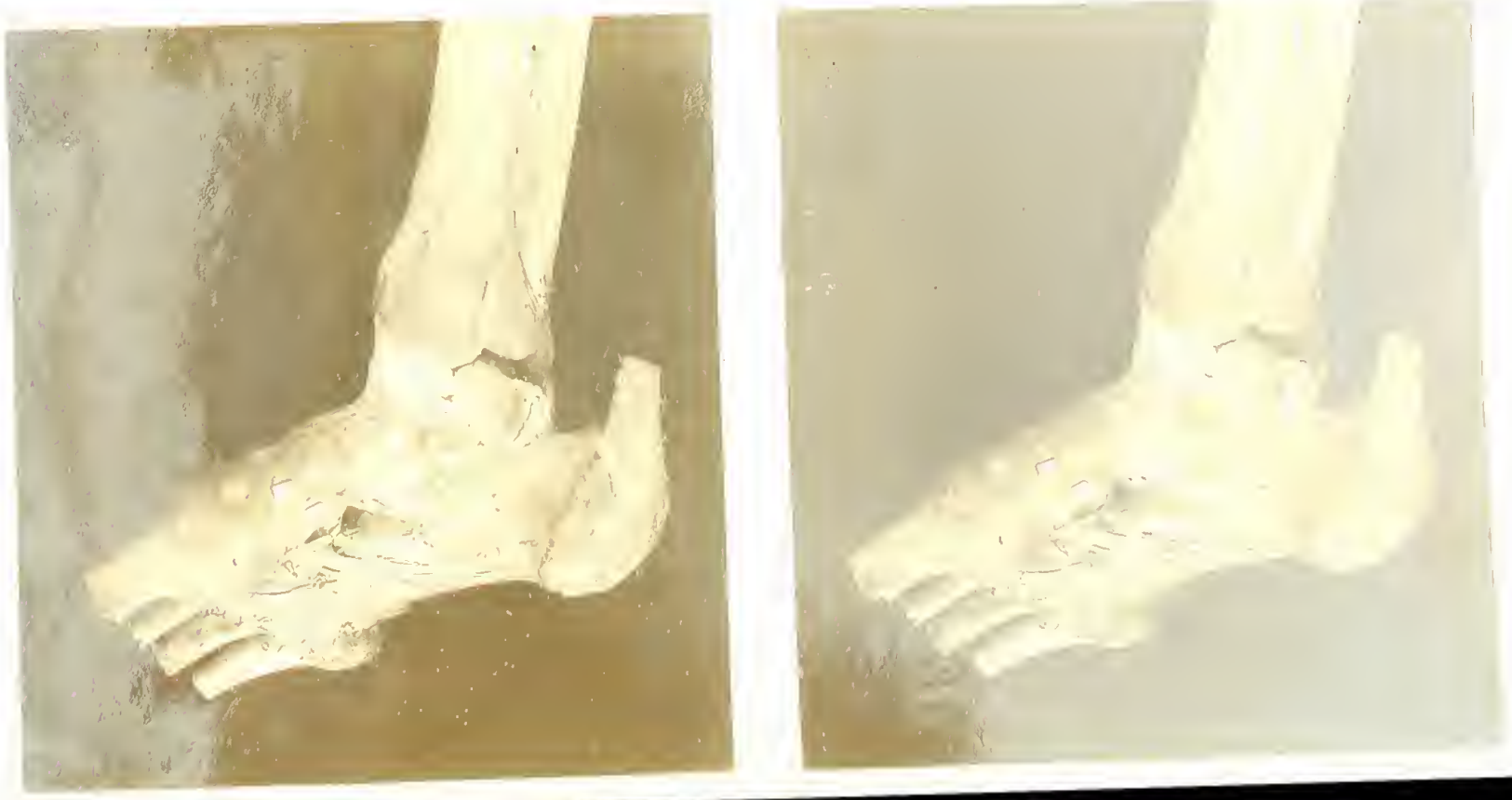
The short plantar ligament lies at a deeper level, and passes from the under surface of the os calcis near the front to the cuboid bone behind the ridge. It is partly covered by the long plantar ligament, but a portion can be seen to the inner side of that band.

The figures indicate—

1. Internal lateral ligament of ankle.
2. Posterior astragalo-calcanean ligament.
3. Groove for tibialis posticus tendon.
4. Inferior calcaneo-scaphoid ligament.
5. Short plantar ligament.
6. Long plantar ligament.
7. Termination of long plantar ligament.
8. Peroneus longus tendon.
9. Slips from tibialis posticus tendon.
10. Tibialis posticus tendon.
11. Scapho-cuneiform articulation.

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LOWER LIMB.

ARTICULATIONS, ANKLE AND FOOT—No. 3.

LIGAMENTS SEEN FROM BEHIND.

1. **Ankle.**—The posterior, almost horizontal, fasciculus of the external lateral ligament is seen passing to the back of the os calcis. It lies below the posterior inferior tibio-fibular ligament, which unites the two bones of the leg, and which conceals almost entirely the transverse ligament, which lies on a deeper plane.

2. **Foot.**—The posterior astragalo-calcanean ligament unites these two bones, passing from a tubercle on the back of the astragalus to the upper and inner part of the posterior portion of the os calcis.

The joints on this aspect are greatly strengthened by the strong tendons of muscles which pass in close relation to them, frequently grooving the bones.

Thus the tibialis posticus and flexor longus digitorum tendons lie in a groove on the back of the lower end of the tibia, while the flexor longus hallucis occupies a deep groove on the back of the astragalus, and the tendons of the peroneus longus and brevis lie in a groove on the back of the external malleolus.

The figures indicate—

1. Groove for tibialis posticus tendon.
2. Groove for flexor longus hallucis.
3. Posterior inferior tibio-fibular ligament.
4. Peroneal groove.
5. External lateral ligament, middle band.
6. External lateral ligament, posterior band.
7. Posterior astragalo-calcanean ligament.
8. Internal lateral ligament of ankle.
9. Tendo Achillis, and bursa between it and the os calcis.

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LOWER LIMB.

SURFACE ANATOMY—No. 1.

FRONT OF THIGH.

With this view Scarpa's triangle No 2. should be compared.

1. Bony points.—The anterior superior spine of the ilium lies at the bottom of a slight depression, and marks the junction between the abdominal wall and the thigh. The crest of the ilium passes upwards and outwards from it, forming a sinuous depressed line, and Poupart's ligament passes downwards and inwards. These lines form the upper limit of the thigh and the lower limb of the abdomen.

The great trochanter also lies in a depressed area in the outer side of the thigh—the figure 8 is placed in front of it, at the level of its upper border, and this level corresponds to the centre of the head of the femur.

2. Muscles.—The sartorius runs downwards and inwards from the anterior superior spine, and is a valuable landmark. To its inner side is the depressed area corresponding to Scarpa's triangle, and to its outer side is a hollow, between the sartorius and the rectus femoris muscles. The lower part of the tensor fasciæ femoris forms a prominence outside this and rather lower down, and the rectus femoris becomes evident in the surface below this point, in the centre of the thigh, and to its outer side is the vastus externus still lower down.

The adductor muscles in the inner side cannot be isolated from one another on the surface.

Vessels.—The figure 7 is placed on the femoral artery near the apex of Scarpa's triangle. The artery higher up lies midway between the anterior superior iliac spine and the pubic symphisis, and passes behind 7 in a line which, continued downwards, goes to the adductor tubercle of the femur.

The figures indicate—

1. Anterior superior spine.
2. Depression between sartorius and tensor fasciæ femoris.
3. Sartorius.
4. Rectus femoris.
5. Tensor fascia femoris, lower part.
6. Vastus externus.
7. On femoral artery.
8. Level of great trochanter (upper margin) and of head of femur.

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LOWER LIMB SURFACE ANATOMY. No. 1.
EDINBURGH STEREOSCOPIC ANATOMY





LOWER LIMB.

SURFACE ANATOMY.—No. 2.

INNER SIDE OF THIGH.

The landmarks on this aspect are entirely muscular, as far down as to the region of the knee-joint. Here the **adductor tubercle** can be felt, between the sartorius and the vastus internus.

This tubercle gives the position of the lower epiphysial cartilage on the inner side.

The sartorius muscle forms an important landmark in nearly its whole length. In the upper part of the thigh it lies to the outer side of the femoral vessels, at the middle third of the thigh it crosses them and comes to their inner side. In this region it forms the roof for Hunter's canal.

The fleshy mass of the adductor muscles is very wide at the upper part, but narrows rapidly as it passes down the thigh. The individual muscles cannot be identified on the surface, but the tendon origin of the adductor longus can be felt at the upper part, and the insertion of the adductor magnus into the adductor tubercle.

With this view, Hunter's Canal, Nos. 1 and 2, should be examined.

The figures indicate—

1. Sartorius muscle, bounding Scarpa's triangle.
2. Adductor muscles.
3. Scarpa's triangle.
4. Hunter's canal, covered by the sartorius muscle.
5. Vastus internus muscle.

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LOWER LIMB.

SURFACE ANATOMY.—No. 3.

FRONT OF RIGHT KNEE.

1. Bony points.—When the knee-joint is fully extended, the **patella** rises up in front of the lower end of the femur, and its lower border comes to be in line with the joint.

Above the patella is a depressed area, corresponding to the fibrous tendon of the quadriceps extensor muscle, rather of the shape of an inverted V. The point of the V passes between the fleshy prominences of the vastus externus and internus muscles, the vastus internus passing lower down than the externus.

The anterior tubercle of the tibia forms a distinct prominence in the middle of the front of the leg, below the ligamentum patellæ, and the external and internal tuberosities lie on each side of it but at a higher level.

The head of the fibula lies at the same level as the anterior tubercle, but is not seen, as it lies on the outer side towards the back.

The prominence of the biceps is seen on the outer side.

On the outer side of the knee is a flattened region, corresponding to the ilio-tibial band, passing down to the external tuberosity of the tibia.

On the inner side is a prominence, formed by the sartorius, adductor gracilis, and semitendinosus muscles, which passes downwards, outwards, and forwards. The muscles cannot be distinguished from one another.

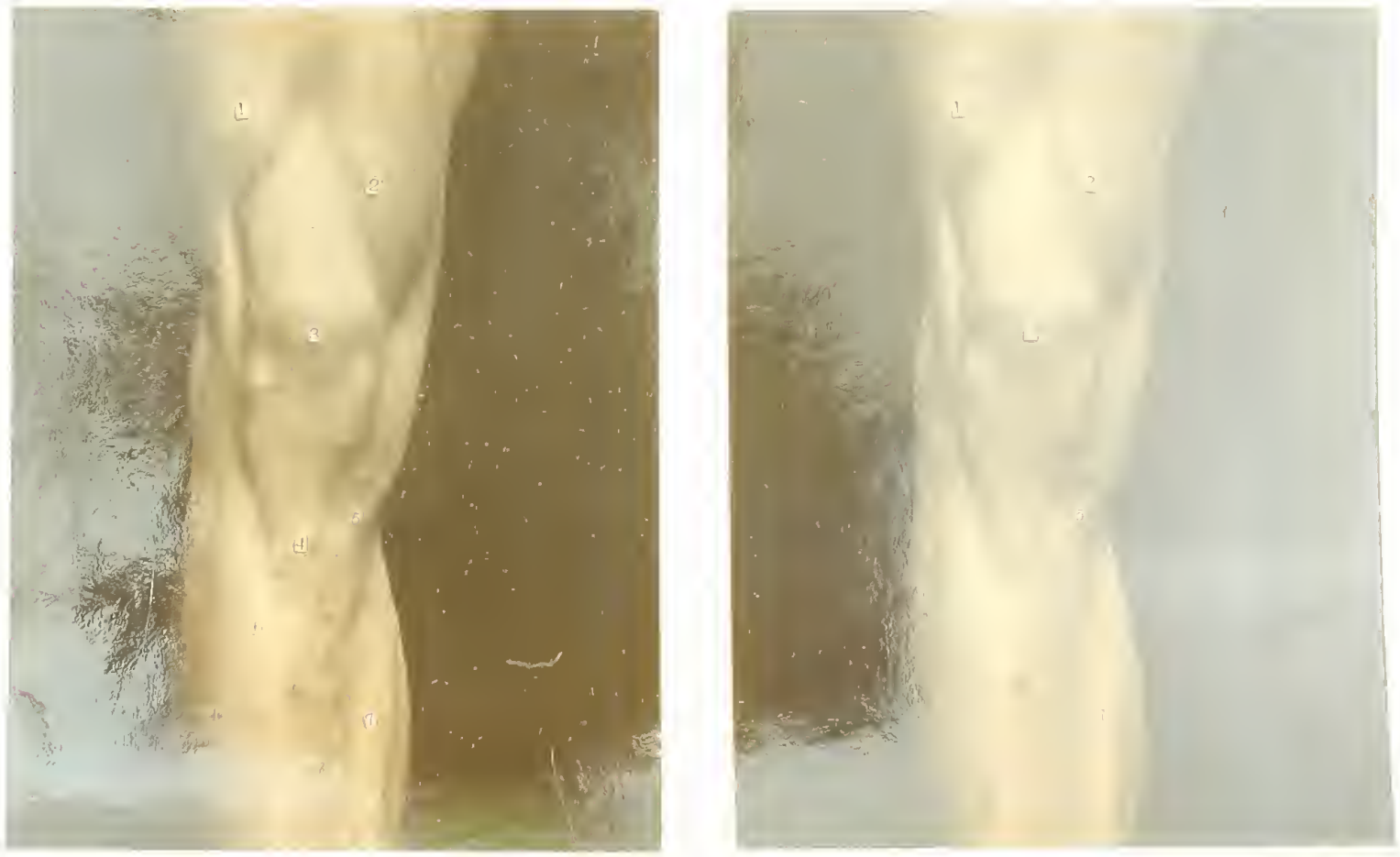
Compare with this view, Knee Joint No. 1.

The figures indicate—

1. Vastus externus.
2. Vastus internus.
3. Centre of patella.
4. Tubercle of tibia.
5. Internal tubercle of tibia.
6. Tibialis anticus.
7. Inner head of gastrocnemius.

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LOWER LIMB.

SURFACE ANATOMY—No. 4.

OUTER SIDE OF LEFT KNEE.

1. Bony points.—When the knee is half flexed, the patella forms a projection in front of the lower end of the femur. Behind it, the external condyle forms a projection below the skin.

The prominence on the front of the external condyle is due to the projection of the highest part of the trochlear surface, and this corresponds to the level of the epiphysial plate of cartilage on the outer side.

The external tuberosity of the tibia can very readily be made out when the limb is in this position, and just above it can be felt a depression, at the bottom of which lies the external semilunar cartilage.

The head of the fibula lies at the bottom of a depression rather to the back on the outer side. The shaft of the fibula can only be made out with difficulty, as it is covered by the peroneal muscles.

2. Muscles and tendons.—The tendon of the biceps stands out very distinctly, and there is a depression just above it, which is limited by the ilio-tibial band.

The tendon of the semitendinosus, lying on the fleshy semimembranosus, forms an almost equally distinct projection on the inner side of the hollow which corresponds to the popliteal space.

In the leg, the two heads of the gastrocnemius can be seen, with a groove between them, and adjoining the outer head is the prominence formed by the peroneus longus, while in front of that are the extensor longus digitorum and tibialis anticus muscles.

The figures indicate—

1. External condyle, front.
2. Patella.
3. External condyle, back part.
4. External tubercle of tibia.
5. Head of fibula.
6. Biceps.
7. Peroneus longus.
8. Gastrocnemius.

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LOWER LIMB.

SURFACE ANATOMY.—No. 5.

OUTER SIDE OF FOOT AND ANKLE.

1. Bony points.—On the outer side of the foot, the base of the fifth metatarsal bone (2) projects below the skin. Immediately behind it lies the cuboid bone, and behind that again is the anterior end of the os calcis.

Upon the outer surface of the os calcis the peroneal tubercle (3) can usually be detected, and it is a guide to the peroneal tendons, the peroneus longus lying in a groove below it, and the peroneus brevis above it.

The external malleolus (1) forms a well-marked prominence, and descends for some distance below the level of the ankle-joint. It is lower than the internal malleolus, and lies on a more posterior plane.

2. Muscles and Tendons.—The extensor brevis digitorum (4) forms a rounded soft elevation on the outer side of the foot, covering the front of the os calcis.

Behind it, the finger can be passed into a depression, the sinus tarsi, between the os calcis and the astragalus.

The tendons of the tibialis anticus (5) and of the extensor longus digitorum (6) form well-marked projections in the front of the foot, and can be traced to their respective insertions.

The figures indicate—

1. External malleolus.
2. Base of fifth metatarsal.
3. Peroneal tubercle.
4. Extensor brevis digitorum.
5. Tibialis anticus.
6. Extensor longus digitorum.

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LOWER LIMB SURFACE ANATOMY. No. 5.
EDINBURGH STEREOSCOPIC ANATOMY

LOWER LIMB.

SURFACE ANATOMY.—No. 5.

OUTER SIDE OF FOOT AND ANKLE.

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